

Plant Breeding Abstracts

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*STATISTICS

1535 TOCHER, K. D.

On the concurrence of a set of regression lines.

Biometrika 1952 : 39 : 109-17.

Given m regression lines of a variable y , subject to error, on a variable x , not subject to error,

$$E(y) = \alpha_i + \beta_i x; \quad (i = 1, 2 \dots m),$$

it is required to test the hypothesis that α_i/β_i is the same for all i on the basis of random samples of n_i observations for each line. Or, equivalently, do the lines concur on the x axis? The usual restrictions of normality and constant variance are assumed and on this basis a test is derived. If the hypothesis is not rejected, a method of obtaining a confidence interval for the point of concurrence is described. The methods are illustrated by an example.

1536 MOORE, P. G.

The estimation of the Poisson parameter from a truncated distribution.

Biometrika 1952 : 39 : 247-51.

The estimation of the Poisson parameter is discussed when all values greater than r are recorded as r . A simple statistic is proposed, its efficiency compared with the maximum likelihood statistic, and the method illustrated by an example.

1537 DAVID, H. A.

Upper 5 and 1% points of the maximum F-ratio.

Biometrika 1952 : 39 : 422-24.

The ratio is that of the largest to the smallest in a set of independent mean squares, all on the same number of degrees of freedom, which is useful as a test of heterogeneity of variance.

1538 SCHEFFÉ, H.

A method for judging all contrasts in the analysis of variance.

Biometrika 1953 : 40 : 87-104.

An ever-recurrent problem in the analysis of variance is the following: we have tested, by the usual F test, whether a set $\mu_1, \mu_2, \dots, \mu_k$ of k means are all equal, and have rejected this null hypothesis. We now wish to state the

form of the differences between the means which have been found to exist; this usually involves several tests of doubtful validity and difficult interpretation. Let $\theta = \sum_{i=1}^k c_i \mu_i$ with

$\sum_{i=1}^k c_i = 0$ be any contrast which might be investigated. Let $\hat{\theta}$ and $\hat{D}^2(\hat{\theta})$ be the usual estimates of θ and its variance, respectively. Then the author shows that the probability is $1 - \alpha$ that the values θ of all contrasts simultaneously satisfy

$$\hat{\theta} - S \hat{D}(\hat{\theta}) \leq \theta \leq \hat{\theta} + S \hat{D}(\hat{\theta})$$

no matter what values the μ_i 's have, where S^2 is $(k-1)$ times the upper α point of the F distribution with $k-1$ and v degrees of freedom (the degrees of freedom of the original F test).

This result enables tests of significance and confidence statements to be made. The F test rejects the null hypothesis if and only if some $\hat{\theta}$ are significantly different from zero, and if it does, we can say just which $\hat{\theta}$. This method is considered in relation to one of Tukey of more limited scope, and its power considered.

1539 KATZ, L.

Confidence intervals for the number showing a certain characteristic in a population when sampling is without replacement.

J. Amer. statist. Ass. 1953 : 48 : 256-61.

A population of N individuals has M exhibiting a characteristic: a sample of n size is drawn without replacement and m have the characteristic. Approximate confidence limits for M are found when m , n and N are known.

1540 MÜLLER, K.-H.

Über die Anwendung der Varianzanalyse in der UdSSR. (On the use of analysis of variance in the USSR).

Dtsch. Landw., Berl. 1953 : 4 : 529-34.

From a detailed analysis of a chapter by Volf in a recent Russian publication by Jurjev, Kučumov, Linnik, Volf and Nikulin on plant breeding methods, the author concludes that

* General studies, see also individual crops.

analysis of variance is an accepted practice in Russian plant breeding programmes.

1541 KEMPTHORNE, O.

A class of experimental designs using blocks of two plots.

Ann. math. Statist. 1953 : 24 : 76-84.

Let the treatments be numbered in a random order, 1, 2, . . . n , and suppose r replications are needed. The i^{th} treatment is placed in a block with each of the treatments $i + s, i + s + 1, \dots, i + s + r - 1$, reduced modulo n , for some s . (This supposes $n + 1 - r$ is even). The analysis and efficiency of these designs are discussed and a method of utilization of the interblock information is given.

1542 WILLIAMS, E. J.

The interpretation of interactions in factorial experiments.

Biometrika 1952 : 39 : 65-81.

In a factorial experiment where the joint effects of two or more factors are not additive, an alternative model is proposed for representing them in which one factor is assumed to be in constant proportion, rather than equal, at different levels of the other factors. The discussion is carried out in the case of two factors, and methods of estimation and tests of significance are derived. The methods are illustrated with a numerical example.

1543 WILLIAMS, R. M.

Experimental designs for serially correlated observations.

Biometrika 1952 : 39 : 151-67.

The designs considered are those of experimental units, e.g. plots in an agricultural experiment, arranged in a linear order, to which treatments are to be applied. Designs of maximum precision are found for two types of correlation between neighbouring units, and examples given. Under certain, rather restrictive, conditions these designs are shown to be more precise than randomized blocks. Goodness-of-fit tests of these models of correlation are made on two series of agricultural data.

1544 LATSCHA, R.

Tests of significance in a 2×2 contingency table: Extension of Finney's table.

Biometrika 1953 : 40 : 74-86.

Finney gave a table whereby the significance of association in a 2×2 table with total number of entries less than 16 could be determined. The test used was the exact one, and the probability levels were 5% and 1% for both one- and two-sided tests. The exact signifi-

cance level was also included. The present tabulation goes as far as marginal frequencies of 20 but is otherwise identical with Finney's.

1545 MÜLLER, K.-H.

Kritische Bemerkungen zu der Arbeit von N. Atanasiu "Über die statistischen Auswertungsmethoden der Feldversuche." (Critical remarks on the publication by N. Atanasiu entitled "The methods of statistical calculation of the results of field experiments").

Z. PflErnähr. Düng. 1954 : 64 : 129-34.

Commenting on a recent paper by N. Atanasiu (cf. Abst. 3), the author criticizes the expression $m_D = \sqrt{m_a^2 + m_b^2}$ used by Atanasiu for the standard error of the difference of means for treated and untreated blocks. As an alternative, the author proposes the formula $m_D = \sqrt{m_a^2 + m_b^2 - r(m_a^2 + m_b^2)}$, where r represents the correlation coefficient between the values for the treated and untreated blocks.

1546 ATANASIU, N.

Zum Aufsatz von K. H. Müller Kritische Bemerkungen zu der Arbeit von N. Atanasiu "Über . . ." (In reply to the paper by K. H. Müller entitled "Critical remarks on the publication by N. Atanasiu entitled 'The methods of statistical calculation. . .'")

Z. PflErnähr. Düng. 1954 : 64 : 135-38.

Replying to K.-H. Müller's criticisms of his expression for the standard error of the difference between means (cf. Abst. 1545), the author sets out reasons justifying the use of the simpler expression. In an appended note, K.-H. Müller reaffirms his original objection.

1547 TEDIN, O & JULÉN, G.

Ett fall, där variansanalysen lämnar felaktig uppfattning om den statistiska säkerheten hos ett försöksresultat. (A case in which the analysis of variance gives a false impression regarding the statistical reliability of the result of an experiment).

Sverig. Utsädesfören. Tidskr. 1953 : 63 : 469-74.

Results of a nitrogen manuring experiment with timothy are discussed to show how the analysis of variance may lead to a misleading conclusion regarding the degree of significance of the results, while a method of analysis based on the standard error of the mean of the individual differences gives a better interpretation. Methods for testing the respective value of the two statistical procedures are indicated.

1548 TORSELL, B.

Några studier över genotypisk och fenotypisk variation hos åkerbruksväxterna och dess betydelse för odlingsvärdet. (**Some studies of genotypic and phenotypic variation in crop plants and its significance for the cultivation value**).

Sverig. Utsädesfören. Tidskr. 1953 : 63 : 416-39.

Genotypic variation in cross-fertilized and self-fertilized plants is considered in relation to the effects of ecological factors upon the cultivation value of a variety and its reliability as regards yield. In general the cultivation value is determined partly by the specific yielding capacity (as defined by Nilsson-Ehle), and partly by the resistance or tolerance characters. Observations on oat varieties at Svalöf, Tornby and Ultuna suggest that where a high average yield of a particular variety is chiefly due to its specific yielding capacity, variation in yield will tend to be larger, whereas, if the high average yield is due to marked resistance and tolerance characters, the range of variation in yield is not necessarily wide.

Some similar tests on peas were also carried out.

1549 Cox, D. R.

Estimation by double sampling.

Biometrika 1952 : 39 : 217-27.

The estimation of a parameter with assigned accuracy in large samples is discussed. The sampling procedure is to take a preliminary sample and from it to estimate the size of the total sample needed in order to obtain the assigned accuracy. A general method of doing this is given. Several examples are included, both with and without nuisance parameters, for example, the estimation of a normal mean when the variance is unknown. The expected sample size is found. Estimation by confidence intervals is also discussed, and the paper concludes with a problem involving a test for the difference between two parameters, followed, if this difference is believed to exist, by its estimation.

*GENETICS

1550 STUBBE, H.

Ergebnisse und Probleme der Vererbungs-forschung. (**Results and problems of inheritance research**).

Kühn-Archiv 1953 : 67 : 1-16.

The study of the laws governing inheritance is

traced back to the time of Aristotle, the impact of Mendel's discoveries on previous hypotheses discussed, and an account presented of present-day research on plasmatic inheritance, the components of the nucleus, mutation and the role it plays in evolution, and Russian work on the inheritance of acquired characteristics.

1551 LERNER, I. M.

The Ninth International Congress of Genetics.

Science 1953 : 118 : 708-09.

An account of the above congress is presented (cf. Abst. 772). The most significant trend at the congress is thought to be the departure from the over simple classical concept of the gene. Statistical and physiological approaches have led to a study of the properties and functions of more complex hereditary systems than in earlier decades.

1552 HOLLANDER, W. F.

The ABC's of genetics.

J. Hered. 1953 : 44 : 213-16.

The advantages of applying generally the type of genetic symbolization used for *Drosophila*, in which a wild or standard type is the basis of reference, are urged.

1553 SCHWARTZ, D.

Studies on the mechanism of crossing over.

Genetics 1953 : 38 : 689-90. (Abst.).

An hypothesis of crossing-over is proposed which incorporates the concept of Belling and also sister-strand crossing-over. It is postulated that chromosomal replication is accomplished by the formation of a new chromatid on a template by the parent chromosome, and that both sister and nonsister crossing-over involves only the new chromatids. Some support to this hypothesis has been obtained from experiments on *Drosophila*.

1554 TANTAWY, A. O. [AL TANTAWI, 'A. UL 'A. 'U].

Theoretical decrease of heterozygosity in case of half-double first cousin matings.

Proc. Egypt. Acad. Sci. 1952 : 8 : 39-43.

Using Wright's method of path coefficients, the author derives the expression $F_n = 1/16 (1 + 12 F_{(n-1)} + 2 F_{(n-2)} + F_{(n-3)})$ for the proportion of heterozygosity after n generations of half-double first-cousin matings.

* General studies, see also individual crops.

1555 BUZZATI-TRAVERSO, A. A.

Paper chromatographic patterns of genetically different tissues: a contribution to the biochemical study of individuality.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 376-91.

Experiments on the recognition of different genotypes in *Drosophila*, musk melon and tomato by means of the technique of paper partition chromatography are described in detail (cf. *PBA**, Vol. XXIII, Abst. 2323).

1556 LEHMANN, E. & PRIOR, J.

Die Störungserscheinungen in Kreuzungen von *Epilobium palustre* und *E. roseum*. (The disturbances in crosses of *E. palustre* and *E. roseum*).

Flora, Jena 1953 : 140 : 175-204.

To supplement the existing body of research on cytoplasmically conditioned aberrations in reciprocal interspecific hybrids of *Epilobium* sect. *Eriophora* (cf. *PBA*, Vol. XVIII, Abst. 1378), the writers have begun the study of hybrids between five races each of *E. palustre* and *E. roseum*, neither of which species belongs to *Eriophora* or exhibits the reciprocal differences that occur when cytoplasmic inheritance is operating.

The various hybrids between these two species displayed a wide range of anomalies affecting plant growth and development and, as far as can be judged at present, apparently conditioned by the genome action.

In hybrid combinations, however, involving the *palustre*-Westerwald biotype, quantitative characteristics in the juvenile stage did exhibit some reciprocal differences which, however, disappeared later on; and slight similar differences were noted in combinations with *palustre*-Titisee.

1557 Fox, A. S.

Protein synthesis and genetics.

Nature, Lond. 1954 : 173 : 350-51.

In connexion with a recent exchange of views by Dounce (cf. Abst. 30) and Campbell and Work (cf. Absts. 29 and 31) concerning the biosynthesis of proteins, the author discusses his investigations on *Drosophila* and *Neurospora crassa*. In the former organism, antigenic specificity is determined by genic interaction; this finding is difficult to reconcile with a one-one relationship between genes and proteins, as stipulated by the template hypo-

thesis. Research on *Neurospora* so far suggests a duality in the genetic control of tyrosinase synthesis, one system governing enzyme concentration and another enzyme specificity. Protein synthesis in the antigen system of *Drosophila* and tyrosinase synthesis in *N. crassa* both appear to occur in two stages: (1) a preliminary stage leading to the production of a nonspecific precursor, and a second stage during which specificity is conferred upon the precursor. On the basis of an amalgamation of the two main views on protein synthesis, viz. a stepwise coupling of many small peptide units and the template hypothesis, it is suggested that the first stage could occur in a stepwise fashion, whereas specificity could be the function of template action. It is emphasized that in any case the gene template cannot be simple. Interactions involving the environment, cytoplasm and nucleus have been detected in tyrosinase synthesis in *Neurospora*.

1558 LEVINE, M.

The diverse mate-killers of *Paramecium aurelia*, Variety 8: their interrelations and genetic basis.

Genetics 1953 : 38 : 561-78.

Grades of mate-killing have been demonstrated among different stocks. No evidence of genic control of these grades could be obtained, suggesting that μ particles control the specificity of mate-killer phenotypes (cf. Abst. 1561).

1559 PREER, J. R. & SIEGEL, R. W.

Cytological demonstration of paramycin in *Paramecium aurelia*.

Genetics 1953 : 38 : p. 684. (Abst.).

A small proportion of the cytoplasmic bodies identified as κ particles exhibited one or more refractile regions; only those strains producing the toxin paramycin contained this type of particle, the sedimentation rate of which was indistinguishable from that of paramycin. It is therefore concluded that such κ particles are the site of paramycin activity.

1560 GECKLER, R. P. & KIMBALL, R. F.

The effects of hypoxia on X-ray destruction of kappa in *Paramecium aurelia*.

Genetics 1953 : 38 : 663-64. (Abst.).

The existence of an oxygen effect on κ has been demonstrated. Only under conditions of hypoxia during X irradiation did less destruction of κ occur. Because of the interest in H_2O_2

as a possible intermediate involved in the indirect action of radiation, tests were carried out on the effects of this substance on κ . No destructive effect could be detected. The results suggest that oxygen enters into some step involved in X-ray damage to DNA-protein material rather than in some step peculiar to chromosome damage.

1561 SIEGEL, R. W.

A genetic analysis of the mate-killer trait in *Paramecium aurelia*, Variety 8.

Genetics 1953 : 38 : 550-60.

The mate-killer character was found to depend upon the presence of cytoplasmic bodies termed μ . *Paramecia* lacking μ are sensitive and die following matings with mate-killers; such matings involve reciprocal fertilization. Production of μ particles is not gene-initiated but the maintenance and reproduction of such particles is determined by a nuclear gene, *M*. Loss of μ is accompanied by micronuclear damage.

1562 BEALE, G. H.

Heredity in *Paramecium*.

Endeavour 1954 : 13 : No. 49 : 33-36.

The inheritance of the killer and antigen systems is discussed. Investigations on these two systems have demonstrated the importance of both nucleus and cytoplasm in determining hereditary properties. Both systems, but especially the antigen system, can serve as models for establishing a hypothesis to explain the nature of cellular differentiation in multicellular organisms. On the antigen model, it can be assumed that only a small proportion of the total number of the genes in the nucleus of a cell influences the course of events in that particular cell, the state of the cytoplasm determining which genes become active. In other cells, other cytoplasmic states stimulate the action of different genes. The state of the cytoplasm is, at least partly, controlled by the environment; thus cell differentiation is accomplished by a complex interaction of genes, cytoplasm and environment.

1563 MICHAELIS, P.

Über experimentell induzierte vermutliche Plasmonmutationen. (On experimentally induced mutations, presumably of the plasmon).

Naturwissenschaften 1954 : 41 : p. 22.

After treatment with the radioactive isotopes P^{32} and S^{33} , *Epilobium hirsutum* x *E. parviflorum*

hybrids displayed leaf aberrations. These changes are attributed to mutations occurring in the cytoplasm.

VARIATIONS, MODIFICATIONS, MUTATIONS

1564 IYAMA, S.

(On heritability).

Ikushungaku Zasshi/Jap. J. Breeding 1953 : 2 : 245-46. [Japanese].

Recent work published in the USA on heritability and the partitioning of variability into its heritable and nonheritable components is reviewed.

1565 MOREE, R.

An unexpected relation between negative assortative mating and gene frequency.

Genetics 1953 : 38 : 677-78. (Abst.).

"Generally speaking, changes in the mating system of a Mendelian population are not followed by changes of gene frequency. The exceptions are selective mating and negative assortative mating. To demonstrate the effect of the latter type of mating system, suppose a population involving one autosomal gene-pair, with complete dominance and equal gene frequencies, to be distributed according to the Hardy-Weinberg law; and suppose that - assortative mating occur on a phenotypic basis. If - assortative mating is complete, the first effect to be noted is the elimination of the homozygous dominant genotype in the second generation, with corresponding decrease in the frequency of the dominant gene. Under other degrees of - assortative mating, the frequency of the dominant gene is reduced, but at rates *not proportional* to the amount of deviation from a system of random mating. The effect of different degrees of - assortative mating on the composition of populations with different initial gene frequencies, will be illustrated."

1566 KOCH, H.

Über die Anwendung des Ultraschalls in Pflanzenbau und Pflanzenzüchtung. (On the use of ultrasonic treatment in plant cultivation and plant breeding). Dtsch. Landw., Berl. 1953 : 4 : 584-88.

Ultrasonic vibrations may be used to increase the yield of a crop, to destroy bacteria, viruses or fungus spores, or to induce mutations. The literature on the subject is reviewed and sketches of the apparatus used are given.

- 1567 SPENCER, J. L., SINGLETON, W. R. & BLAKESLEE, A. F.
Induced pollen lethals from seeds of *Datura stramonium* treated with thermal neutrons.
 Proc. nat. Acad. Sci., Wash. 1953 : 39 : 288-92.

Chromosomal and genic types of induced pollen abortion can be distinguished (cf. Abst. 1568). Only 34%, 16% and 8% of the flowers of plants raised from seed treated with thermal neutrons for 2, 4 and 6 hours, respectively, were free from aborted pollen. Affected flowers contained aborted grains of either the chromosomal or genic type, or a combination of both. The aborted grains were, however, predominantly chromosomal in origin. The percentage of both types rose with the duration of exposure and the ratio of the chromosomal type to the genic did not change significantly with increased dosage.

- 1568 YOST, H. T. (JUN.), SINGLETON, W. R. & BLAKESLEE, A. F.
The effect of thermal neutron radiation on the chromosomes of *Datura*.
 Proc. nat. Acad. Sci., Wash. 1953 : 39 : 292-97.

Experiments on treating seeds of *D. stramonium* with thermal neutrons have confirmed the hypothesis suggested earlier that aborted pollen grains induced by irradiation are of two types: (1) very small grains with more or less degenerate contents, due to genic mutation and (2) small, empty, shrivelled grains associated with chromosomal changes. With thermal neutron irradiation, gene mutations causing pollen abortion occur much less frequently than chromosomal alterations.

- 1569 VILLAX, E.
 Quelques données sur l' "hybridation végétative." (Some facts on "vegetative hybridization").
 Melhoramento 1953 : 6 : 57-74.

An historical survey is presented of Mičurin's experiments and theories on vegetative hybridization, and of their development by Lysenko. Soviet geneticists may be confusing vegetative chimeras and the phenomenon of bizzarria with vegetative hybridization. Hybridization is, however, only possible by means of sexual crosses. Experiments along the lines suggested by Lysenko were carried out, red tomato varieties being grafted on to yellow tomatoes and *vice versa*. In a limited number of cases the red-fruited stock caused a small reddish

patch to appear on the underside of the yellow tomatoes produced by the yellow scion. This characteristic was not transmitted to later generations.

EVOLUTION

- 1570 GEORGE, N. T.
Fossil species.
 Sci. Progr. 1954 : 42 : 220-28.

Recent studies on the validity of the species concept when applied to fossil assemblages which vary both in space and time are reviewed. Biometrical investigations have demonstrated that many of the narrower "intuitively" defined fossil species are merely variants in a wider taxonomic continuum. Methods of establishing subspecies in a continuous temporal fossil lineage are also discussed.

- 1571 SUKAČEV, V. N. (Editor).
 (In connexion with N. D. Ivanov's article, "Selection and mutual relations between organisms").
 Bjull. mosk. Obšč. Ispyt. Prirod. (Bull. Moscow Soc. Nat.) 1953 : 58 : No. 1 : p. 83. [Russian].
 IVANOV, N. D.
 (To Academician V. N. Sukačev, Editor of the *Bulletin of the Moscow Society of Naturalists, Biological Section*).

Ibid. 1953 : 58 : No. 1 : 84-85. [Russian].
 Responsibility for a misleadingly worded passage implying acceptance of Malthusian laws on overpopulation, with reference to human society, which was contained in the paper cited above, is admitted by the author and the editorial staff.

- 1572 PAVLOV, N. V.
 (Criticism of the new concept of the species).
 Bjull. mosk. Obšč. Ispyt. Prirod. (Bull. Moscow Soc. Nat.) 1953 : 58 : No. 3 : 51-65. [Russian].

Lysenko's concept of the species and his dicta on the absence of intraspecific competition and of mutual help are rejected. A new definition of the species is given.

*CYTOLOGY

- 1573 OKSIJUK, P. F. & HUDJAK, M. I.
 (Fertilization and early developmental phases of the embryo and endosperm in soft wheat).
 Bot. Ž. (Bot. J.), Kii'v 1952 : 9 : No. 4 : 21-33. [Ukrainian].

HUDJAK, M. I.

(Formation of new cells in the endosperm of spring wheats).

Ibid. 1952 : 9 : No. 4 : 35-40. [Ukrainian].

These papers incorporate the substance of a report that has already been summarized in *PBA*, Vol. XXIII, Abst. 2337.

1574 MAKINO, S.

(A new acetocarmine technique for seeing the internal structure of chromosomes).

Senshokutai (Chromosome)/Kromosomo 1949 : Nos. 5-6 : p. 265. [Japanese].

A modified acetocarmine technique for cytological material is described, involving pre-soaking in cold water (12-13° C) and subsequent warming, after maceration in acetocarmine, in a water bath at *ca.* 50° C for 20 minutes.

1575 OINUMA, T.

(A method of fixing involving potassium nitrate).

Senshokutai (Chromosome)/Kromosomo 1950 : No. 7 : 289-92. [Japanese].

Pretreatment with 0.1 M KNO₃ before fixing is recommended for obtaining chromosome preparations showing clear structural details.

1576 SATO, S.

(Nuclear staining with Dahlia).

Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 397-98. [Japanese].

A staining technique for root-tip chromosomes involving fixation in 2 BE or Carnoy's fluid, treatment with N HCl at 60-62° C, and staining in Grüber's Dahlia is described.

1577 BISWAS, B. B.

Investigation of ribo and desoxyribo-nucleic acid in Cyanophyceae.

Curr. Sci. 1953 : 22 : 346-47.

Staining with methyl green and pyronin indicated that the central bodies of *Oscillatoria* and *Calathrix* contained ribose nucleic acid and possibly deoxyribose nucleic acid in a low state of polymerization.

1578 SONNENBLICK, B. P.

Neotetrazolium as a visible indicator of radiation damage: reaction of *Allium* cytoplasm to X-radiation.

Genetics 1953 : 38 : 692-93. (Abst.).

Observations on the response of untreated and X-irradiated root-tip cells to neotetrazolium have been recorded. Upon reduction, this salt undergoes progressive colour changes, becoming converted into insoluble purple-black granules in the perinuclear cytoplasm, with no visible

evidence of intranuclear reduction. This response can therefore be used to indicate the spatial and temporal patterns of the cytoplasmic dehydrogenases. Doses exceedingly detrimental to nuclei and much higher doses did not prevent reduction of neotetrazolium in *Allium* cytoplasm.

1579 MOSES, M. J. & TAYLOR, J. H.

Desoxypentose nucleic acid synthesis during microsporogenesis in *Tradescantia*.

Genetics 1953 : 38 : 678-79. (Abst.).

Sections of buds were prepared for autoradiographic analysis and for cytophotometric estimation of the DNA (Feulgen) content of the nuclei during the meiotic and two mitotic divisions of microsporogenesis. In general, a constant relationship existed between the amount of DNA per cell and chromosome number. Prior to any of the divisions, however, the amounts of DNA had doubled before chromosome doubling was visually discernible. Three brief periods occurred when increasing DNA values were detected: (1) leptotene, (2) late microspore interphase and (3) early pollen interphase in the generative nucleus. P³² was incorporated in the DNA fraction only at those stages during which the DNA values were increasing. DNA synthesis, involving at least the sugar and P portions of the molecule, therefore, apparently takes place rapidly and at specific times during the cell cycle. The timing of the synthetic period at interphase was not necessarily related to cytological criteria of stage in the cell cycle but appeared to vary with the type of the cell.

1580 NAYLOR, J. M.

Cytological studies of the effects of plant growth substances in lateral bud inhibition.

Genetics 1953 : 38 : p. 679. (Abst.).

Evidence was obtained from experiments on *Tradescantia paludosa* that inhibition of the meristem of lateral buds by natural auxins or synthetic growth substances involves a control of the synthesis of deoxyribose nucleic acid as well as of mitosis.

1581 SHARMA, A. K., MOOKERJEE, A. & GHOSH, C.

Alkaline phosphatase technique in plant chromosomes.

Portug. acta biol. 1953 : Sér. A : 3 : 341-54.

In experiments on monocotyledonous plants, alkaline phosphatase activity was found to correspond with the processes of nucleination and denucleination in the nucleolus and chromosomes during mitosis and meiosis. This result

is discussed in relation to the possible control of the specificity of genes by their nucleic acid component. The activity detected is believed to be the expression of a highly complex enzyme system. After the elimination of nucleic acid by treatment with perchloric acid, the nucleolus retained its phosphatase activity. The existence of another phosphoprotein complex in the nucleolus, in addition to ribonucleoprotein, is thought to be the most plausible explanation of this retention.

1582 PATAU, K.

DNA constancy.

Genetics 1953 : 38 : 680-81. (Abst.).

Statistical analysis of replicated DNA (Feulgen) determinations by the photometric two-wave-length method, using human spermatozoa, salivary gland nuclei and prophase nuclei of onion, provided support of the hypothesis that the DNA content is constant for a given chromosome complement. Continuous variation in DNA content occurs only as part of a precise DNA doubling in the course of reproduction of the complete genome. The constancy detected suggests that DNA is organized as a self-reproducing and non-variable structure which may be either the gene itself or the gene template. Radioisotope investigations on phages and study of DNA in pneumococci have given results leading to similar conclusions.

1583 SATO, D.

(Caryotype and ecological environment).

Senshokutai (Chromosome)/Kromosomo 1951 : No. 8 : 336-38. [Japanese].

A general discussion is presented of the relationships between caryotype and environment in tropical plants, species growing in cold or mountainous climates, xerophytes, halophytes, hydrophytes, insectivorous plants, parasites and medicinal plants.

1584 SATO, D.

(External morphology, in particular the gigas type, and caryotype).

Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 454-59. [Japanese].

A review of the relations between plant size, cell size and environment is presented. Large plant size depends on either large cell size or on large number of cells. Cell size is proportional to nuclear volume, which depends on both the number and size of the chromosomes. With increase in chromosome number due to polyploidy, there is a tendency for plant size to increase concomitantly; however, increase in chromosome number is often accompanied by

a reduction in chromosome size. Chromosomes tend to be smaller in plants native to tropical climates, where growth is rapid, in contrast to the slower growing plants of cold regions.

1585 YUASA, A.

(Review of the spiral structure of chromosomes. III).

Senshokutai (Chromosome)/Kromosomo 1949 : Nos. 5-6 : 235-48. [Japanese].

Recent work on the spiral construction of the chromosome, developmental changes of the component strands, number of strands, mode of contraction of the chromosomes and relationship of the strands at chiasma formation is reviewed.

1586 YUASA, A.

(Review of the spiral structure of chromosomes. IV).

Senshokutai (Chromosome)/Kromosomo 1951 : No. 11 : 430-34. [Japanese].

In this concluding section of the author's review (cf. Abst.1585), special attention is given to aberrant chromosomes, salivary gland chromosomes and structural changes in the chromosome spirals.

1587 SPARROW, A. H. & CHRISTENSEN, E.

Tolerance of certain higher plants to chronic exposure to gamma radiation from cobalt-60.

Science 1953 : 118 : 697-98.

Species of different genera showed a wide range in tolerance of chronic exposure to γ radiation from Co^{60} , as indicated by morphological observations. The data suggest that chromosome size may be a factor determining radio-sensitivity, since plants with large chromosomes, such as *Tradescantia*, *Lilium* or *Vicia*, were generally more sensitive than those with smaller chromosomes.

1588 NUŽDIN, N. I., KOPYLOVA, E. N. & NEČAEV, I. A.

(Cytological description of chromosome changes on inbreeding).

Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 127-49. [Russian].

Data on staining, structure and breakage of the chromosomes of inbred lines of *Drosophila melanogaster* are presented. Comparisons between inbred and noninbred lines showed that inbreeding decreased fertility and that the deleterious effects of inbreeding upon fertility were intensified by reducing the protein supply. Fertility was appreciably improved when crosses were made between inbred flies in which one parent only had been reared on a protein-deficient diet. The improvement in fertility

was most pronounced when the males had been given a full diet.

- 1589 HYDE, B. B.
Differentiated chromosomes in *Plantago ovata*.
Amer. J. Bot. 1953 : 40 : 809-15.

At pachytene in *P. ovata* ($n = 4$) each chromosome consists of deeply staining proximal segments on either side of the centromere and lightly staining distal segments. Two chromosomes have terminal nucleolar organizers similar in staining capacity to the median segments. The differentiation characterizing each chromosome at pachytene closely corresponds with that at mitotic prophase. The species provides useful material for general cytological studies.

- 1590 JENSEN, H. W.
Several considerations regarding chromosomes and evolution in the angiosperms.
J. Elisha Mitchell sci. Soc. 1953 : 69 : 85-86. (Abst.).

Cytological investigations of the native angiosperms of western North Carolina suggest two generalizations: (1) angiosperms, exclusive of polyploid genera, usually exhibit varying degrees of departure from normal meiosis, whereas completely regular meiosis is only typical of polyploid species; and (2) the major evolutionary lines have been confined to plants with low chromosome numbers and unspecialized chromosomes.

- 1591 PICO, M., MARGARITA, L. & DUNCAN, R. E.
The effects of 5-aminouracil on chromosome structure in *Vicia faba* and the reversal of these effects.
Genetics 1953 : 38 : p. 676. (Abst.).

Feulgen-negative regions are produced by 5-aminouracil treatment, as the result of interference in, presumably, the thymine metabolism before anaphase. These regions, appearing as small erosions in the metaphase chromosomes, become extended into long intercalary gaps traversed by strands which stain with basic fuchsin and connect the centric and proximal segments. In *V. faba*, the Feulgen-negative regions occur preferentially at four regions in the chromosome set. Addition of an equimolar amount of cytidine sulphate to a 50 ppm. solution of 5-aminouracil resulted in only 10% of the number of Feulgen-negative regions induced by 5-aminouracil alone.

- 1592 GAMOW, G.
Possible relation between deoxyribonucleic acid and protein structures.
Nature, Lond. 1954 : 173 : p. 318.

It is shown that the rhomboid interstices between the four kinds of nucleotides in Watson and Crick's proposed structure for nucleic acid (cf. Abst. 58) may be of 20 different sorts according to the chemical structure of the four bounding nucleotides. Since there are about 20 aminoacids known to constitute proteins, it is suggested that each aminoacid may fit into one type of interstice and that, by their so doing, specific peptide chains can be built up.

- 1593 CAROLI, G. & BLIXT, S.
The morphology of the chromosomes of *Pisum*.
Agri hort. genet., Landskrona 1953 : 11 : 133-40.

The comparative lengths of the seven chromosomes of *P. sativum* were established. Chromosome II, the shortest of the seven, with a length of 3.8 μ , was the most stable in respect of both length and proportion between the two arms, and was therefore used as the standard. Chromosome I was the longest, with a length of 5.4 μ . The morphological characteristics of the different chromosomes, including satellites and constrictions, are given.

- 1594 CHOUINARD, A. L.
Heterochromatic bodies in differentiated cells of *Raphanus sativus* roots.
Genetics 1953 : 38 : p. 659. (Abst.).

In the nuclei of differentiated cells situated 4-6 mm. from the root apex, the number of heterochromatic bodies varied from 8 to 18, but was never higher or lower than that of nuclei in meristematic cells. The nuclei in the differentiated region showed significant differences in the absolute and relative sizes of their heterochromatic bodies, some of which were obviously polytene.

- 1595 KANEZAWA, R.
(A list of chromosome numbers of woody plants. I. Gymnosperms. II. Monocotyledons).
Senshokutai (Chromosome)/Kromosomo 1949 : Nos. 5-6 : 249-60. [Japanese].

The tables give haploid and diploid chromosome numbers, together with authorities and references. The species are arranged alphabetically under families.

- 1596 GLUŠČENKO, I. E., ÈLLENGORN, J. A. E., AFANASJEVA, A. S. & ŽIRONKIN, I. M. (The question of the origin and development of plant cells). Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 106-26. [Russian].

This joint article contains the substance of investigations already summarized in *PBA*, Vol. XXII, Absts. 1618 and 1619.

- 1597 JABLONSKI, J. R. & SKOOG, F. **Cell enlargement and cell division in excised tobacco pith tissue.** Physiol. Plant. 1954 : 7 : 16-24.

No cell divisions were observed in pure pith tissue cultured on a modified White's agar medium and treated with indoleacetic acid at concentrations (2-3 mg./l.) optimal for cell enlargement; increases in nuclear material were associated with the cell enlargement. Cell division occurred, however, in pith tissues with attached vascular strands, or in contact with vascular tissues. The material active in inducing cell division was contained in water extracts from vascular tissue and various plant products such as coconut milk or malt, and was diffusible through agar.

- 1598 NAYLOR, J., SANDER, G. & SKOOG, F. **Mitosis and cell enlargement without cell division in excised tobacco pith tissue.** Physiol. Plant. 1954 : 7 : 25-29.

When pith tissue cultured on a modified White's agar medium was treated with a 2 mg./l. solution of indoleacetic acid (cf. Abst. 1597), mitoses were induced without cytokinesis. The nuclear divisions reached their maximum frequency 70 hours after the commencement of treatment, well in advance of the cell expansion observable after 3-4 days. Various degrees of polyploidy were induced; polyploidy also occurred, especially in the younger cultures.

- 1599 DEUFEL, J. **Zytologische Untersuchungen an sezernierenden Zellen. (Cytological investigations on secretory cells).** Naturwissenschaften 1954 : 41 : 41-42.

The secretory cells of 65 plants belonging to 37 species were examined cytologically. Prior to the secretory stage, increases in the amount of plasma and in the size of the nucleus, usually accompanied by endomitosis, were observed. In most plants the cells became tetraploid or octoploid, but were 128-ploid and 64-ploid in *Urtica dioica* and *Loasa papaverifolia* respectively.

- 1600 HAQUE, A. **Non-synchronised mitosis in a common cytoplasm.** Heredity 1953 : 7 : 429-31.

In *Tradescantia paludosa*, binucleate pollen grains were observed in one lobe of a single anther, along with normal grains. In 73.5% of the dividing binucleate grains, mitosis was synchronized, whereas in the remaining 26.5% it was nonsynchronized. The two types of mitosis are explained by assuming that the plant was heterozygous for a gene (*A*) controlling the threshold for mitosis.

- 1601 WADA, B. **(Some problems connected with the spindle).** Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 379-83. [Japanese].

The author's theory of the relationship between the nucleus and spindle and on the persistence of the nuclear membrane (cf. *PBA*, Vol. XXI, Abst. 2343) is amplified by observations on the nature of the spindle membrane in *Tradescantia* as revealed by treatment with nitrogen mustard.

- 1602 TANAKA, N. & SINOTO, Y. **(Effects of caffeine on cell division of Tradescantia paludosa).** Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 370-78. [Japanese].

Concentrations of caffeine below 0.05% stimulated mitosis in root-tip cells; higher concentrations were inhibitory. Chromosome breakage and bridge formation sometimes resulted.

- 1603 HINDMARSH, M. M. **The effect of colchicine on the spindle of root tip cells.** Proc. Linn. Soc. NSW 1952 : 77 : 300-06.

Colchicine above a concentration of 0.1% destroys the spindles in all stages of mitosis and prevents spindle formation. As the spindle appears to be responsible for organizing nuclear division all the chromosome abnormalities produced by colchicine treatment derive from the destruction of the spindle.

- 1604 TRAUB, H. P. **Acenaphthene in 0.5% ethanol-water solution as a chromosome shortener.** Euclides, Madr. 1953 : 13 : 444-46.

Treatment of excised growing root-tips of *Allium cepa* and other meristems with a saturated solution of acenaphthene in 0.5% aqueous ethanol, prior to killing and fixing, caused shortening of the metaphase chromosomes. The duration of treatment varied from 1½ to 3 hours, depending on the material, room temperature and degree of shortening desired.

1605 MARTY, M.

Anomalies mitotiques dans la germination de blé en atmosphère appauvrie en oxygène. (**Mitotic anomalies in the germination of wheat in an atmosphere with a low oxygen concentration**).

CR Acad. Sci., Paris 1954 : 238 : 718-20.

In conditions of low oxygen concentration, germination was impeded and the frequency of mitosis reduced. The chromosomes were contracted and thickened and metaphase was prolonged.

1606 ÖSTERGREN, G., KOOPMANS, A. & REITALU, J.

The occurrence of the amphiastral type of mitosis in higher plants and the influence of aminopyrin on mitosis.

Bot. Notiser 1953 : No. 4 : 417-19.

A preliminary account of experiments on the effects of aminopyrin upon mitosis in root tips of *Allium* spp. is given. Roots of *A. cepa* and *A. schoenoprasum* were tested with a concentration of 0.1 and 0.05 ml. per litre, respectively. Both treatments gradually repressed mitosis, the higher concentration also having a partly lethal effect. Both concentrations caused reversion of prophase to the resting phase, an intermediate telophase-like process being induced. Characteristic double-star anaphases were also produced by the two treatments.

1607 CHOUINARD, A. L.

Effects of sodium selenite on meristematic cells of onion root tip.

Genetics 1953 : 38 : 658-59. (Abst.).

Onion roots were immersed for 1 hour in 0.05-1.0% aqueous solutions of sodium selenite at 25°C in darkness. Within two hours after treatment, the mitotic index decreased, the higher the concentration the lower being the index. At concentrations of 0.5% and 1.0% metaphases accumulated and irregularities in the spindle structure occurred. After 30 minutes in concentrations higher than 0.1, orange yellow spherical granules, staining purplish red with Feulgen, appeared in the cytoplasm.

1608 DEYSSON, M.

Action des constituants pyrimidiques des acides nucléiques sur la division des cellules végétales. (**Action of the pyrimidine constituents of nucleic acids on the division of plant cells**).

CR Acad. Sci., Paris 1954 : 238 : 145-47.

Experiments were made to determine whether thymine and cytosine had the same effects as

uracil on cell division in *Allium cepa* L. (cf. *PBA*, Vol. XXII, Abst. 2447 and Vol. XXIII, Abst. 82). Weak concentrations of thymine, but not of cytosine, stimulated mitosis, whereas strong concentrations of either substance had an inhibitory effect.

1609 DEYSSON, M.

Comparaison de l'action exercée par le chloral et par son glucoside, le chloralose, sur la division des cellules méristématiques d'*Allium Cepa* L. (**Comparison of the action caused by chloral and its glucoside chloralose on the division of the meristematic cells of *A. Cepa* L.**).

CR Acad. Sci., Paris 1954 : 238 : 1064-66.

Chloralose inhibits mitosis but exhibits no mitoclastic action. Chloral inhibits both.

1610 SNOAD, B.

Abortive meiosis in plasmodial pollen mother cells of *Helianthemum*.

Ann. Bot., Lond. 1954 : 18 : No. 69 : 1-6.

The anthers of two garden varieties of *Helianthemum* contained a mixture of normal pollen mother cells and plasmodia with varying numbers of nuclei whose chromosome numbers also varied. The plasmodia probably resulted from a split spindle associated with a failure of wall formation during premeiotic mitosis. Meiosis was normal in the plasmodia until the end of division I after which it proceeded no further. Chromosome pairing during meiosis was higher than might be expected in the plasmodia, presumably as the result of somatic pairing in previous mitoses.

1611 LOVELACE, R.

The shattering of *Tradescantia* chromosomes by ultraviolet radiation (2650 Å).

Genetics 1953 : 38 : 675-76. (Abst.).

Only chromatid and isochromatid deletions were found in the nuclei of pollen tubes derived from grains which had received less than 5×10^5 ergs/cm.² at the wave length 2650 Å, but shattering of portions of the chromosomes occurred in some of the cells subsequent to higher doses at this wave length. The amount of shattering increased with the dosage; no such shattering was obtained with the wave lengths 2804, 3130 and 3650 Å.

1612 BORA, K. C.

Delayed effects in chromosome breakage by X-rays in *Tradescantia bracteata*.

J. Genet. 1954 : 52 : No. 1 : 140-51.

The cytological effects of a single dose of X rays

were compared with those of the same dose divided into equal fractions and separated by varying intervals of time. Chromosome breakage was delayed, suggesting that the action of X radiation is indirect, involving the induction of intermediate biochemical processes. Most of the breaks either underwent restitution or reunited within a short time after their production. The duration of the process of breakage probably depended upon the radiation intensity.

1613 BORA, K. C.

XII. Delayed effects in chromosome breakage by X rays.

Brit. J. Radiol. (Röntg. Soc. Sect.)
1954 : 37 : No. 314 : 124-27.

The author discusses investigations which have been reported fully in a previous paper (Abst. 1612).

1614 DESCHNER, E. R.

The relation of break sensitivity and rejoining in *Trillium* following X-irradiation.

Genetics 1953 : 38 : 660-61. (Abst.).

Previous experiments had indicated that the chromosomes of *T. erectum* were 50 times more sensitive to X irradiation at first meiotic interphase than at early postmeiotic interphase, radiosensitivity being estimated on the basis of scoring acentric fragments. Sensitivity was inversely associated with rejoining, i.e. a higher amount of rejoining occurred in cells irradiated at early interphase than in those treated at metaphase I. In further investigations irradiation has been applied at increasingly sensitive stages, viz. early, mid and late prophase. The amount of rejoining of broken ends in the form of chromatid bridges was significantly higher at late prophase. High sensitivity to primary breakage is therefore not necessarily related to a low frequency of rejoining.

1615 WOLFF, S.

Effects of chemical protective agents on the restitution rate of radiation-induced chromosomal aberrations in *Vicia faba*.

Genetics 1953 : 38 : p. 702. (Abst.).

Evidence has been obtained from experiments with X-irradiated seeds that pretreatment with a 2×10^{-3} M solution of BAL increases the frequency of the restitution of broken ends and hastens the onset of restitution. Pretreatment with a solution of sodium hydrosulphite of the same concentration also decreased the number of chromosomal aberrations obtained.

1616 CONGER, A. D.

The relative biological effectiveness of radiation from a nuclear detonation on *Tradescantia* chromosomes.

Science 1954 : 119 : 36-42.

Buds of *Tradescantia* were exposed to (1) mixed radiation inside aeroplanes flown through an atomic cloud at various altitudes; (2) essentially pure γ rays, in thin protective containers or so-called γ -ray stations, at increasing distances along the ground from the nuclear device; and (3) radiation, chiefly fast neutrons, received inside thick lead hemispheres or neutron stations. A series of control experiments designed to simulate as closely as possible the conditions in the above three types of test was also carried out. Dose determinations were made on the basis of both physical measurements and estimations of the frequencies of chromosomal aberrations, and the relative biological effectiveness of the different forms of radiation was calculated.

1617 KIRBY-SMITH, J. S. & SWANSON, C. P.

The effects of fast neutrons from a nuclear detonation on chromosome breakage in *Tradescantia*.

Science 1954 : 119 : 42-44.

SHEPPARD, C. W. & DARDEN, E. B. (JUN.).

Appendix. Physical dose estimates in the detonation experiments and neutron calibration in the cyclotron.

Ibid. 1954 : 119 : 44-45.

Using inflorescences of *T. paludosa*, experiments were carried out with the object of obtaining quantitative data on the fast neutron dose derived from nuclear detonations, the radiation being received in neutron stations (cf. Abst. 1616). A general agreement was obtained between dose determinations based on frequencies of chromosome aberrations and physical measurements. No important differences were detected between the effects of laboratory-produced fast neutrons and those originating from nuclear detonation. Determinations of the relative biological effectiveness of neutrons and X rays in inducing different types of chromatid and chromosome aberrations are given.

1618 STEFFENSEN, D.

Induction of chromosome breakage at meiosis by a magnesium deficiency in *Tradescantia*.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 613-20.

In *T. paludosa*, magnesium deficiency induced chromosome aberrations and stickiness at

meiosis; chromosome fragments were nine times more frequent in Mg-deficient plants than in the controls. Stickiness appeared to be the cause of the chromosome abnormalities. Magnesium-deficient plants showed no nuclear or chromosomal disturbances during mitosis. Micronuclei frequencies were also increased in plants raised in Mg-deficient culture solutions. Possible disturbances induced in the metabolism of deoxyribose nucleic acid by the Mg deficiency are discussed.

1619 PLAUT, W. S.

Some observations on P^{32} concentration and distribution in *Lilium* buds.
Hereditas, Lund 1954 : 40 : 242-48.

Data on the rate of uptake, the distribution and concentration of P^{32} in buds of *L. henryi* and *L. longiflorum* are discussed. The P^{32} activities in the anthers entered the range in which radiation damage must be considered. Caution is advocated in making the *a priori* assumption that the pattern of P^{32} distribution in buds of two related species is similar. The validity of autoradiographic analysis of DNA synthesis in microsporogenesis is briefly discussed in relation to the P^{32} dosage.

1620 DERENNE, P.

Effets morphologiques, physiologiques et cytologiques dus à l'action de l'isopropylphénylcarbamate sur les genres *Allium*, *Vicia* et *Hordeum*. (**Morphological, physiological and cytological effects due to the action of isopropylphenylcarbamate on the genera *Allium*, *Vicia* and *Hordeum***).
Bull. Inst. agron. Gembloux 1953 : 21 : 37-57.

In addition to a study of the morphological and physiological effects of isopropylphenylcarbamate on the roots and leaves of *A. cepa*, *A. cepa* x *A. fistulosum*, *V. faba* and *H. sativum*, its mitoinhibitory action in root tissue of plants of the same three genera was also investigated. The cytological effects also include chromosome fragmentation. The effects on mitosis were proportional to the concentration of the dose. Metabolic effects were usually proportional to the dosage, but *H. vulgare* exhibited some differences in this respect.

The possibility of a selective action of isopropylphenylcarbamate on the Gramineae and other plant groups is considered.

1621 WALSH, M. P. & MC MAHON, J. B.

The cytological effects of OMPA.
Genetics 1953 : 38 : p. 699. (Abst.).

In experiments on onion root-tips, solutions of

octamethyl pyrophosphoramidate (OMPA) showed c-mitotic effects and also appeared to have a dissolving action upon the matrix of the chromosomes; the substance may also be a mutagenic agent.

1622 DEYSSON, M.

Nouvelles recherches sur les fragmentations chromosomiques provoquées par l'uracile et l'uridine chez l'*Allium Cepa* L. (**New researches into chromosome fragmentation caused by uracil and uridine in *A. Cepa* L.**).

CR Acad. Sci., Paris 1954 : 238 : 378-80.

Chromosome fragments arising from the action of these two chemicals are not derived from short chromosomes or from chromosomes with satellites, but correspond to the rupture of a secondary constriction.

1623 ROSEN, G. VON

Breaking of chromosomes by the action of elements of the periodical system and by some other principles.
Hereditas, Lund 1954 : 40 : 258-63. (Abst.).

Experiments on the ability of different elements to break the chromosomes in root tips of *Pisum* seedlings have so far led to the following conclusions. The halogenic series of the periodic system induces breakage, but not when present as anions. The remaining elements can be divided into three groups with respect to their ability to cause breakage: (1) very active elements, viz. Tl, Cd, Cu, Os, Hg, Ag, Ti, Ta, Au, Pt, Cr and Co, in order of decreasing activity; (2) weakly active metals, such as Zn, Li, La, Fe or Ca; and (3) more or less inactive elements, e.g. Na, K, Mg, Ba or Bi. The threshold-value range at which an active metal causes visible breaks is normally narrow. The most sensitive period is early prophase. The data obtained indicate that the metallic ion itself causes breakage. The number of points in a chromosome at which a metallic ion may act is limited but this activity is not specific for each element. The vulnerable points in a chromosome may increase as the result of the combined effect of different metals.

Chromosome breakage was also induced by placing germinated seeds in aqueous solutions between two platinum electrodes in a continuous circuit, but so that the hydrogen and oxygen formed at the electrodes were isolated from the seeds by a water bridge. The frequency was apparently proportional to the strength of the current, the tension, specific conductivity of the water and duration of treatment. The

breakage was not due to the secondary action of a hypochlorite compound. Temperature changes each day during root growth also caused breakage. Among the organic compounds tested for capacity to induce chromosome disturbances, the -SH and alcohol radicals exhibited activity. Roots grown in pure water showed a low frequency of fragmentation and bridges.

In discussing the possible mode of action of metallic ions, it is suggested that they force some radicals out of the protein complexes and form chemically complex bodies in the plasma; this process could bring about the observed despiralization.

1624 REVELL, S. H.

A new hypothesis for "chromatid" aberrations.

Heredity 1953 : 7 : p. 447. (Abst.).

The following hypothesis has been developed, primarily to account for visible chromosome changes induced by radiomimetic chemical compounds in root-tip cells of *Vicia*. All changes previously interpreted as chromatid or isochromatid breaks, or as the result of reunion between these breaks, are assumed instead to arise from the induction of chromatid exchanges. It is suggested that such exchanges may be induced only at points of chromosome association and that the process of their formation is similar to that of meiotic chiasmata. Interpreted in this way the observations do not provide any direct evidence of breakage. It is proposed that this hypothesis should be estimated to include X-ray-induced aberrations of the same type.

1625 BROCK, R. D.

Spontaneous chromosome breakage in *Lilium endosperm*.

Ann. Bot., Lond. 1954 : 18 : No. 69 : 7-14.

Abnormal mitoses, resulting from spontaneous chromosome breakage and reunion, occurred in the endosperm of *L. regale* and *L. davidii* var. *willmottiae* x *L. dauricum* 'Phyllis Cox' four weeks after fertilization. The development of these abnormalities was probably initiated by single chromatid bridges at anaphase. *L. regale* showed only single bridges. In the hybrid, anaphases with 1, 2, 3, 4, 5, 6, 7 and 9 chromatid bridges were observed, and further breakage, followed by reunion, resulted in the formation of multiple bridges, rings, dicentrics and fragments. Restitution led to the production of highly polyploid nuclei in which mass breakage occurred. The abnormalities culminated in abortion of the endosperm of the

hybrid variety and in the consequent death of the normal embryo. It is suggested that chromosome breakage is of wide importance in the failure of interspecific hybridization.

1626 WILKINSON, J.

The effects of "aspermy" virus upon nuclear behaviour in certain Solanaceous plants.

Proc. Soc. Stud. Fertil. No. 4 : 53-54.

Meiotic disturbances produced in *Nicotiana glutinosa* (cf. *PBA*, Vol. XXIII, Abst. 2877) and the tomato (cf. *PBA*, Vol. XXII, Abst. 2326) as the result of infection with the aspermy virus are briefly described. Nuclear abnormalities have also been observed during mitosis in infected plants (cf. *PBA*, Vol. XXIII, Abst. 2352).

1627 HAGA, T., SATO, D. & YAMASHITA, K.

(Dialogue I. Structural changes in chromosomes).

Senshokutai (Chromosome)/Kromosomo 1949 : Nos. 5-6 : 267-72. [Japanese].

A general discussion of various problems relating to the structure, homology and pairing of plant chromosomes, with special reference to chromosome aberrations, is presented in dialogue form.

1628 PARTHASARATHY, N.

The use of induced autopolyploids in plant breeding.

Indian J. Genet. 1953 : 13 : 1-6.

The differences in morphology, physiology, ecological requirements and fertility which occur between diploids and autopolyploids of the same species are discussed. The induction of polyploidy is considered most suitable in cross-fertilized plants with low chromosome number and for those propagated vegetatively. Selection of polyploids for fertility, and study of the fertility of the female gametes in diploids and polyploids themselves are advocated.

1629 BERGER, C. A. & WITKUS, E. R.

A cytological study of the development of *Galtonia candicans* Decne.

Bull. Torrey bot. Cl. 1953 : 80 : 501-06.

Polyploid divisions occurred spontaneously in the cortical cells of the cotyledon and transitional region between the shoot and root in seedlings of *G. candicans*. Such divisions, chiefly tetraploid, began to take place when the seedling was 8 mm. long, but were never observed in seedlings over 20 mm. in length. The chromosomes were always paired, apparently as the result of double reduplication of the chromosomes in the resting stage. It is suggested that polyploidy was associated with an auxin effect.

- 1630 HAYASE, H.
(**Mixoploidy in plants**).
Senshokutai (Chromosome)/Kromosomo
1951 : No. 8 : 324-35. [Japanese].

A general review of natural and artificially induced mixoploidy, polysomaty and somatic pairing in plants is presented.

- 1631 FENZL, E. & TSCHERMAK-WOESS, E.
Untersuchungen zur karyologischen
Anatomie der Achse der Angiospermen.
(**Investigations on the caryological
anatomy of the axis of angiosperms**).
Öst. bot. Z. 1954 : 101 : 140-64.

The occurrence and distribution of endopolyploid nuclei and cells in the permanent tissues of the axes of the inflorescence and vegetative shoots in numerous species of angiosperms are discussed, special attention being given to chromosome behaviour.

The occurrence of endopolyploidy in the axis is associated with systematic position.

- 1632 OLÁH, L. V.
Ácidos nucleicos y división celular.
(**Nucleic acids and cell division**).
Lilloa 1952 : 25 : 615-28.

The effect of sodium ribonucleate on cell division in root tips of *Allium sativum* and *A. cepa* is described. The phenomena observed were, in many respects, similar to those resulting from treatment with colchicine, but the following differences were noted: pronounced condensation of the chromosomes, the formation of lampbrush structures, the development of Feulgen-negative chromosome segments, the orientation of chromosomes into parallel configurations, and tumour formation associated with disorientation of the spindle.

- 1633 LEWIN, R. A.
Konduto de seksĉeloj de *Chlamydomonas*.
(**Behaviour of the sex cells of *Chlamydomonas***).
Esperanto 1953 : 73-74; Contr. Osborn
bot. Lab. Yale 1953 : No. 8.

A brief popular discussion of the effect of environmental and genetic factors on mating type in *Ch. moewusii* is presented.

- 1634 GAVRILOVA, O. M.
(**The effect of "supplementary" male
cells upon fertilization processes in
plants**).
Izv. Akad. Nauk SSSR (News Acad.
Sci. USSR) 1953 : No. 6 : Ser. Biol. :
37-45. [Russian].

The effects of pollination with a large amount of pollen upon fertilization processes, notably upon cytoplasmic changes occurring in the

somatic tissues of the maternal organism, in *Lilium henryi*, *L. wilmottiae* and *L. regale* are discussed from the Mičurinite viewpoint.

- 1635 CROWE, L. K.
(**Incompatibility in the Compositae**.
Heredity 1953 : 7 : p. 445. (Abst.).

In *Cosmos bipinnatus* and another, unspecified, member of the Compositae, a multiple allelic system at one locus determines the incompatibility system. The pollen reaction is under sporophytic control, the alleles showing dominance or individual action in both the pollen and style, according to the combination in which they are found.

DISEASES, INJURIES, BACTERIA, FUNGI, VIRUSES

- 1636 ALEKSEEVA, L. N.
(**Changes in biological properties of
paradysenteric bacteria caused by
ultrasonic waves**).

Latv. PSR Zināt. Akad. Vēstis 1952 :
65 : No. 12 : 95-104. [Russian].

Flexner's S strains of bacteria changed their biochemical and serological properties, besides showing extensive dissociation, when treated with supersonic waves for 1, 5, 10 15 or 25 minutes.

- 1637 WEED, L. L. & LONGFELLOW, D.
(**Morphological and biochemical
changes induced by copper in a
population of *Escherichia coli***.
J. Bact. 1954 : 67 : 27-33.

The addition of small amounts of copper ions to a culture of *E. coli* resulted in the appearance of mutants with increased resistance to ultra-violet irradiation and differences in metabolism when compared with the parent strain.

- 1638 WATSON, J. D. & HAYES, W.
(**Genetic exchange in *Escherichia coli*
K 12: evidence for three linkage
groups**.
Proc. nat. Acad. Sci., Wash. 1953 : 39 :
417-26.

It has been previously suggested by Hayes that genetic exchange in *E. coli* is unidirectional, F⁺ cells behaving as gene donors and F⁻ cells as gene acceptors in zygote formation (cf. *PBA*, Vol. XXIII, Abst. 1714). Further experiments have led to the view that genetic recombination is limited to a nonspecific fraction of the loci of the F⁺ parent, as the result of the incomplete transfer of genetic material. Experimental data were obtained indicating that the loci were transferred in three linkage groups. It is suggested that the F⁺ contribution consists of

discrete chromosomes. Concerning the infrequent appearance of unselected F⁺ loci in prototrophs, two definite conclusions are reached: (1) these prototrophs cannot be entirely due to the reversal of F⁺ polarity in a cross, and (2) K 12 strains differ in the frequency with which they transfer unselected loci.

- 1639 FRÉDÉRICQ, P. & BETZ-BAREAU, M.
Transfert génétique de la propriété colicinogène chez *Escherichia coli*.
(Genetic transfer of the colicinogenic characteristic in *E. coli*).

CR Soc. Biol., Paris 1953 : 147 : 1110-12.

At the Institute of Bacteriology of the University of Liège, the progeny of a cross between the colicinogenic strain K 30 and the noncolicinogenic strain W 1177 of *E. coli* inherited the colicinogenic properties of K 30 but were otherwise similar to W 1177. The hybrid strain proved highly infertile.

- 1640 FRÉDÉRICQ, P.

Recombinants issus du croisement de souches lysogènes et colicinogènes.
(Recombinants arising from the crossing of lysogenic and colicinogenic strains).

CR Soc. Biol., Paris 1953 : 147 : 1113-16.

Many of the progeny of the cross K 30 x W 1177 of *Escherichia coli* (cf. Abst. 1639) were both lysogenic and colicinogenic. It is not considered that this fact has any bearing on their high level of sterility.

- 1641 FRÉDÉRICQ, P. & BETZ-BAREAU, M.

Transfert génétique de la propriété de produire un antibiotique. (Genetic transfer of the characteristic of producing an antibiotic).

CR Soc. Biol., Paris 1953 : 147 : 1653-56.

The progeny of a cross between an F⁻ colicinogenic strain of bacteria and an F⁺ non-colicinogenic strain possess, without exception, the colicinogenic properties of the F⁻ parent. The transfer of the colicinogenic character is independent of other properties (cf. Abst. 1640).

- 1642 STOCKER, B. A. D., ZINDER, N. D. & LEDERBERG, J.

Phage transduction of flagellar characters in *Salmonella*.

Heredity 1953 : 7 : p. 448. (Abst.).

Some phages of *Salmonella* possess the ability to transfer genetic material from their previous host to a small fraction of the cells of a new host. Nonmotile strains treated with bacteria-free lysates of other strains produce stable motile forms detected as spreading swarms in semisolid agar. Nonflagellated mutant strains

produce swarms with the flagellar antigen or antigens characteristic of their species; otherwise untypable nonflagellated strains can be assigned to species by the flagellar antigens of their induced swarms. The production of swarms by nonflagellated strains when treated with lysates of other nonflagellated strains demonstrates the existence of at least six genetic factors, mutation of any of which may cause absence of flagellae, thus masking other genes which regulate flagellar antigens. In some exceptional cases, two distinct flagellar characters may be simultaneously induced, e.g. flagellation and a flagellar antigen, perhaps indicating that the pairs of genes concerned are linked.

- 1643 GOWEN, J. W., STADLER, J., PLOUGH, H. H. & MILLER, H. N.

Virulence and immunizing capacity of *Salmonella typhimurium* as related to mutations in metabolic requirements.

Genetics 1953 : 38 : 531-49.

Sixty-seven spontaneous or radiation-induced nutritional mutants of *S. typhimurium* were studied with respect to their virulence and capacity to stimulate active immunity in mice. The mutant lines exhibited significant differences in both virulence and immunizing capacity, the virulence of a mutant being correlated with its immunizing power. In general, the virulence of a mutant was related to that of its parent. A highly virulent parent tended to produce less virulent mutants, whereas an avirulent parent tended to give rise to mutants with increased virulence. A similar tendency was shown with respect to immunizing capacity. No consistent relationship, however, existed between parents and mutants for either virulence or immunizing power. The data suggested that the particular nutritional characteristics of the mutants may not be the primary cause of variations in virulence or immunizing capacity. These variations may be due to mutation of other genes arising simultaneously with mutation for nutritional requirements. Alternatively, the genes controlling a given nutritional requirement may occur at several loci and possess multiple effects.

- 1644 LABRUM, E. L.

A study of mutability in streptomycin-dependent strains of *Escherichia coli*.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 280-88.

The frequencies of spontaneous reversion and induced reversion from streptomycin dependence

to nondependence were estimated for 70 different *Sd* mutants. Manganese chloride was the mutagen used. The strains differed in their frequencies of both types of reversion and no mutagen-stable strain was detected. Study of 15 strains also revealed differences in mutation rate. The three strains investigated exhibited similar patterns of delayed appearance of induced mutants, complete expression of these occurring by about the fifth or sixth division.

- 1645 NORRIS, R. F., DE SIPIN, M., ZILLIKEN, F. W., HARVEY, T. S. & GYÖRGY, P.
Occurrence of mucoid variants of *Lactobacillus bifidus*. Demonstration of extracellular and intracellular polysaccharide.
J. Bact. 1954 : 67 : 159-66.

The occurrence of spontaneous mucoid mutants of *L. bifidus* is described. Although these strains have not been observed to revert to the nonmucoid state, further mutation to the aerobic unbranched form of *L. parabifidus* frequently occurs.

- 1646 WITKIN, E. M.
Effects of temperature on spontaneous and induced mutations in *Escherichia coli*.
Proc. nat. Acad. Sci., Wash. 1953 : 39 : 427-33.

The final yield of ultraviolet-induced mutants resistant to phage T 1 was reduced to approximately 5% when the incubation temperature subsequent to irradiation was 16° C, as compared with the final yield at 37° C. Little reduction occurred with a temperature of 25° C. The effect of temperature on the number of induced mutants was restricted to the period of the first division after irradiation. The temperature coefficients for spontaneous mutation per unit time, cell division and the delayed appearance of induced mutations per unit time were identical. The effect of posttreatment incubation at 16° C could be exactly duplicated at 37° C by reducing the ultraviolet dose from 800 to 100 ergs per mm².

- 1647 MOROWITZ, H. J.
The action of ultraviolet light and ionizing radiation on spores of *Bacillus subtilis*. I. The ultraviolet lethal action, mutation action and absorption spectra.

Arch. Biochem. 1953 : 47 : 325-37.

The lethal action, mutation action and adsorption spectra were determined experimentally for spores of *B. subtilis*. These spectra indicate the wave-length specificity of the different

Diseases, Injuries, Bacteria, Fungi, Viruses *continued*.

effects of ultraviolet radiation; the possibility of obtaining very exact physical measurements of genetic processes by means of the spectroscopic technique is therefore stressed.

- 1648 WAINWRIGHT, S. D.
Effects of post-irradiation treatment with iodoacetate upon ultra-violet irradiated spores of *Streptomyces* T12.

Genetics 1953 : 38 : 698-99. (Abst.).

A short period of incubation of ultraviolet-irradiated spores with iodoacetate caused an increase in survival, associated with a change in the proportion of cells giving rise to colonies exhibiting heritable variation. The presence of peptone during incubation suppressed the increase in survival, and affected, but did not prevent, changes in the proportion of variant colonies.

- 1649 ANDERSON, E. H. & BILLEN, D.
The influence of post-irradiation temperature treatment on X-ray-induced mutations in *Escherichia coli*.

Genetics 1953 : 38 : 653-54. (Abst.).

After X irradiation, the mutants P 82/r (purineless), P 62 (prolineless), T 83-8 (tyrosineless) and A 45-25 (arginineless) were incubated for 48 hours at temperatures ranging from 6° to 37° C and then further incubated at 37° C only for 5 or more days. Viability and the rate of reversion to the nonrequiring condition were determined. The effect of temperature treatment after irradiation varied according to the strain. Mutants P 62 and P 82/r showed the maximum rate of induced reversion within the temperature range in which minimal survival of the exposed cells occurred. With T 83-8 the reversion rate increased with temperature up to 18° C, after which a further rise in temperature had no effect. The fourth strain, A 45-25, showed the maximum rate of reversion at the temperature range at which maximum survival was obtained. Except for A 45-25, the pattern of response to temperature shown by the rate of spontaneous reversion differed from that characterizing the rate of induced reversion. For all four mutants the absolute number of induced reverse mutants was maximal in the range of 18-24° C.

- 1650 BRADFIELD, J. R. G.
Electron microscopic observations on bacterial nuclei.

Nature, Lond. 1954 : 173 : 184-86.

Observations on *Staphylococcus aureus* and *Paracolobactrum* sp. by means of the electron

microscope confirm the existence of a nuclear apparatus largely similar to the nuclei of higher organisms, but dissimilar in certain respects, such as the degree of development of the nuclear membrane. The problem of nuclear evolution is briefly discussed. It is suggested that three main levels of "nuclear" organization may be distinguished, excluding those small viruses which contain no deoxyribonucleic acid: (1) coexistence of deoxyribonucleic and ribonucleic acid without localization in well-defined structures, as, presumably, in many small and medium-sized viruses; (2) localization of these compounds in chromosomes and nucleoli within a moderately well-defined nucleus, which divides mitotically, as in the two bacteria studied and, possibly, some large viruses; and (3) a fully differentiated nucleus dividing mitotically.

- 1651 YANAGITA, T., MORIMURA, Y. & SASA, T. **Studies on the development of resistance of microorganisms to antibacterial substances. II. Variability of individual cells in bacterial populations in their sensitivity towards various antibacterial substances.** J. Antibiot. 1952 : 5 : 426-28; also Stud. Tokugawa Inst. 1953 : 7.

The survival of *Staphylococcus aureus* 209 P, *Escherichia coli*, *Salmonella paratyphi* B, *Shigella dysenteriae* and *Lactobacillus casei* in increasing concentrations of phenol, sublimate, furacin, penicillin and streptomycin was determined and the degree of heterogeneity for resistance within each culture was assessed. The development of resistance varied according to which culture and antibacterial substances were involved.

- 1652 YANAGITA, T. **Dependency of the effect of various antibacterial substances on the size of inoculum.** J. Antibiot. 1953 : 6 : 33-37; also Stud. Tokugawa Inst. 1953 : 7.

It is shown that the growth of bacterial colonies in the presence of antibacterial substances may increase with the size of the bacterial inoculum. When this occurs it is probably due to a higher number of resistant cells being present in the larger inoculum, since experiments with acriflavine, sulphanilamide, furacin and penicillin exclude the possibility in these cases that the substance is made ineffective by the bacterium through adsorption or neutralization of the substance by the cells.

- 1653 SAPERSTEIN, S., STARR, M. P. & FILFUS, J. A. **Alterations in carotenoid synthesis accompanying mutation in *Corynebacterium michiganense*.** J. gen. Microbiol. 1954 : 10 : 85-92.

Work carried out at the University of California showed that the yellow parent type produced cryptoxanthin and lycopene; a pink mutant, lycopene and spirilloxanthin; an orange mutant, cryptoxanthin, β -carotene and canthaxanthin; a red back-mutant, lycopene only; and colourless mutants produced no carotenoids. Thiamine was the only nutritional factor found to affect the formation of the pigments.

- 1654 VINTIKA, J. **Význam mikrobiálních symbios v zemědělství. (The importance of microbic symbiosis to agriculture).** Sborn. čsl. Acad. Zeměd. 1954 : 27 : 79-96.

Intraspecific and interspecific relations between microorganisms are discussed in the light of recent literature. In the writer's view, competition and mutual help occur both between different species and within a species and are important forces in evolution.

- 1655 GOFFART-ROSKAM, J. & WELSCH, M. **Adsorption de bactériophages par un staphylocoque polylysogène. (Assimilation of bacteriophages by a polylysogenic staphylococcus).**

CR Soc. Biol., Paris 1953 : 147 : 1116-18.

The lysogenic strain 59 of *Micrococcus pyogenes* var. *aureus* yields two distinct types of bacteriophage, one forming exclusively small plaques, the other predominantly large plaques. Observations of single bursts suggest that a single bacterium may produce the two types simultaneously.

- 1656 BERTANI, G. **Prophage dosage and immunity in lysogenic bacteria.** Genetics 1953 : 38 : p. 656. (Abst.).

Doubly lysogenic strains of bacteria are obtainable, producing two types of phage, distinguishable on the basis of one or more genetic markers. Ten independent virulent mutants of phage P2 of *Shigella dysenteriae* have been isolated which can be grouped into three classes, depending, respectively, on their ability to lyse (1) singly lysogenic cells, (2) both singly and doubly lysogenic cells, and (3) neither type. It is therefore possible to discriminate between singly and doubly lysogenic strains on the basis of the degree of

immunity shown towards a superinfecting virulent mutant, independently of the phage markers used to recognize the double lysogenic condition; this favours the hypothesis that doubly lysogenic strains carry a double dose of prophage. This discrimination between the two types is possible even when weakly virulent mutants, unable to lyse either lysogenic type, are used. A weakly virulent phage, superinfecting a singly lysogenic culture, appears as mature phage chiefly between 8 and 12 cell generations after superinfection, whereas when superinfecting a doubly lysogenic culture, its reproduction is greatly reduced and no production peak is obtained.

1657 LEE, H. H.

The mutation of *E. coli* to resistance to bacteriophage T 6.

Arch. Biochem. 1953 : 47 : 438-44.

The rate of spontaneous mutation of *Escherichia coli* to T 6 resistance was found to be independent of the growth rate for generation times ranging from 2 to 10 hours, a result similar to that previously reported by Novick and Szilard for T 5 resistance (cf. *PBA*, Vol. XXI, Abst. 1630 and Vol. XXIII, Abst. 5). When tryptophane is used to control growth, the mutation rate to T 5 resistance exceeds that to T 6 resistance; the rates of mutation to resistance to these two phages are similar, however, when the supply of C or P in the medium is the growth-limiting factor. Theophylline, a mutagen previously found by Novick and Szilard to increase mutation to T 5, had little or no effect upon mutation to T 6. The results are discussed in the light of the suggestion of these two authors that the cellular distribution of mutagens and antimutagens may have a differential influence upon mutation rates (cf. *PBA*, Vol. XXIII, Abst. 926).

1658 STAKMAN, E. C. & CHRISTENSEN, J. J.

Problems of variability in fungi.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 35-62.

The variation among various fungi, chiefly the rusts and smuts, and their adaptation to different hosts and environmental conditions are reviewed. The ability of fungi to accommodate themselves to different chemical media is considered to be a genuine case of adaptation, but the apparent adaptation to previously nonsusceptible hosts is probably due to mutation or to unrecognized strains in the pathogenic fungus. Mutation rate, how it is affected, and the formation of new races by hybridization are also discussed.

1659 AHMAD, M.

A consideration of the term and mechanism of heterothallism.

Pakist. J. Sci. 1953 : 5 : 59-66.

Homothallism and heterothallism are redefined. The terms monothallic and bithallic are proposed to distinguish respectively between types in which sexual reproduction proceeds normally in uninucleate single spore cultures and types in which initiation or completion of sexual reproduction is deferred until complementary strains meet. It is suggested that α , β and α , β , γ , δ represent the strains in bipolar and tetrapolar bithallism, respectively. Types and mechanisms of bithallism are discussed. The term pseudo-monothallism is proposed in place of pseudo-heterothallism for cultures which appear monothallic because the spores from which they originated contained two complementary nuclei.

1660 DRAWERT, H. & MÜLLER, R.

Über den Wert morphologischer Merkmale für die Systematik der Gattung *Penicillium* Link. Ein Beitrag zur Variationsbreite von *Penicillium notatum* Westling. (On the value of morphological characteristics for the classification of the genus *Penicillium* Link. A contribution on the range of variation of *P. notatum* Westling).

Flora, Jena 1953 : 140 : 253-87.

As a preliminary to species diagnosis in fungi, a study must be made of (a) the range of variation due to modification and (b) the internal and external causes of such changes. Applying this principle to *Penicillium*, for which such a large number of species have been claimed, the authors record the results of tests of growth variation in a single-spore culture of a *P. notatum* strain (cf. Abst. 1662), when grown on a series of different natural and chemically defined substrates.

1661 MÜLLER, R.

Studien über die Sektorenbildung bei *Penicillium*. (Studies on sector formation in *Penicillium*).

Flora, Jena 1953 : 140 : 209-52.

In a strain of *P. notatum*, two morphologically and physiologically differentiated types of colony have been identified. Cytological examination showed that the nuclei in the basic colony and in the sector do not differ fundamentally in chromosome number or in form or fine structure. The chromosome number $n = 2$, attributed to *Penicillium*, could not be confirmed.

In the present case, sector formation is regarded as having a certain hereditary basis, though dependent also on environmental factors and especially the presence of trace elements. It is also suggested that modifiable, plasmatic effects may underlie the different frequencies observed in sector formation on different substrates.

- 1662 DRAWERT, H. & MÜLLER, R.
Über die Konstanz einer "Sektoren-
variante" von *Penicillium notatum*
Westling. (On the constancy of a
"sector variant" of *P. notatum*
Westling).
Flora, Jena 1953 : 140 : 444-52.

A highly unstable sector variant of the strain RJ 5500 that occurred once in about 1500 cultures is described, with observations on the behaviour of four growth forms to which it gave rise.

- 1663 ROEGNER, F. R., STAHMANN, M. A. &
STAUFFER, J. F.
**Induction of variants in *Penicillium*
chrysogenum by methyl-bis (β -
chloroethyl) amine.**
Amer. J. Bot. 1954 : 41 : 1-4.

Addition of small amounts of methyl-bis (β -chloroethyl) amine to a bicarbonate-buffered conidial suspension at intervals, so that a step-wise increase in concentration was attained, was found to be a more effective method of inducing variants than the single addition of a more highly concentrated solution. With the former treatment the ratio of variants to survivors continued to increase so long as viable conidia remained, and a higher proportion of stable variants was obtained. The variants consisted of a wide range of new colonial types. Many of the variants had lost the ability to synthesize yellow pigment, penicillin or various substances essential for growth.

- 1664 PONTECORVO, G., GLOOR, E. T. &
FORBES, E.
**Analysis of mitotic recombinations
in *Aspergillus nidulans*.**
J. Genet. 1954 : 52 : No. 1 : 226-37.

Previous investigations by Pontecorvo and his colleagues have shown that in artificially synthesized heterozygous diploid strains of *A. nidulans*, *A. niger* and *Penicillium chrysogenum* somatic recombination occurs regularly (cf. *PBA*, Vol. XXIII, Abst. 1725 and p. 663-64; and Vol. XXIV, Abst. 101). The present paper reports a study of such recombination in two diploid strains of *A. nidulans*, heterozygous for the same six markers in different coupling arrangements. It is postulated that two

processes are at work: (1) irregular distribution of whole chromosomes at mitosis, resulting in the formation of haploid nuclei recombining markers on different chromosomes; and (2) mitotic crossing-over, leading to the occurrence of diploid nuclei in which homozygosity for one marker gene is accompanied by homozygosity for all the alleles linked to it in coupling and repulsion. Cross-overs involving more than one chromosome, or double crossing-over, appear to be rare, except possibly across the centromere. The deduction made by Pontecorvo (cf. *PBA*, Vol. XXIII, Abst. 128) that mitotic crossing-over is concentrated in certain nuclei is now regarded as erroneous and based upon the failure to recognize the first of the above two processes.

- 1665 REISNER, A., BARRATT, R. W. &
NEWMEYER, D.
**Confirmation of the seventh linkage
group of *Neurospora crassa*.**
Genetics 1953 : 38 : p. 685. (Abst.).

The loci *sfo*, *thi-3* and *nt* have been found to be situated in linkage group VII.

- 1666 KEOSIAN, J.
**Some effects on *Neurospora crassa*
of sulfanilamide as a component of
the crossing medium.**
Genetics 1953 : 38 : p. 673. (Abst.).

Sulphanilamide had an adverse effect upon perithecial production, number of asci per perithecium and ascospore germination. A large number of the ascospores from the cross grown in a medium containing 0.03% sulphanilamide formed abnormal colonies which persisted through many transfers, the chief variant being an albino form. Several cultures derived from the crosses in sulphanilamide-containing media showed a greater resistance to the growth-retarding effect of this substance than did the parents. Pretreatment of the parent strains with various concentrations of sulphanilamide before crossing in sulphanilamide-containing media did not alter the results obtained. Pretreatment before crossing in a sulphanilamide-free medium gave results similar to those obtained from the untreated controls.

- 1667 PITTENGER, T. H.
**Pseudo-wild type strains in *Neuro-
spora*.**
Genetics 1953 : 38 : p. 683. (Abst.).

Among the 654 phenotypically wild-type progeny of 17 crosses, 99 different pseudowild types (PWT) were discovered, which involved mutants in each of the five linkage groups tested. The PWT's were phenotypically wild

and were derived from normal-sized ascospores from the progeny of crosses of mutants with closely linked genes. In crosses of PWT's with standard wild types approximately 50% of the outcross progeny were mutants. It could be shown that both parental mutants, if distinguishable, were recovered from the outcross progeny, unless one of the original strains carried a linked translocation, in which case only one of the parental mutants was recovered. Mutant and wild-type macroconidia were recovered from all the PWT's tested. Each PWT was "unisexual." PWT strains were heterocaryotic with respect to two linked mutants but not in cases involving a marker gene belonging to an independent linkage group. It is postulated that the pseudowild strains originated from unstable disomic nuclei.

1668 STRAUSS, B. S. & PIEROG, S.

Gene interactions : the mode of action of the suppressor of acetate-requiring mutants of *Neurospora crassa*.

J. gen. Microbiol. 1954 : 10 : 221-35.

STRAUSS, B. S.

Gene interaction : the mode of action of the suppressor of acetate-requiring mutants of *Neurospora crassa*.

Genetics 1953 : 38 : 695-96. (Abst.).

Further information on the single-gene, acetate-requiring *ac* mutants is given (cf. *PBA*, Vol. XXIII, Abst. 935). The *ac* mutants are deficient in the ability to oxidize pyruvate directly, and accumulate 3-hydroxy-2-butanone (acetylmethylcarbinol). The mutants can decarboxylate pyruvate to acetaldehyde and can form ethanol. Their growth characteristics show that they are able to synthesize acetate from glucose or ethanol. The mutants are however inhibited by sucrose or glucose. The glucose inhibition can be relieved by the single-gene suppressors *sp* and *car*, which lower the activity of pyruvic carboxylase and permit some growth of *ac sp* and *ac car* strains in the absence of added acetate. Probably the mutation *ac* results in the formation of acetaldehyde or some closely related compound from glucose in amounts inhibitory to the growth of the mutants, and either suppressor retards the production of acetaldehyde, thus relieving the glucose inhibition. Such suppressors may often be loss mutations, preventing the formation or accumulation of inhibitory substances.

1669 YANOFKY, C.

Further studies with the *td* mutants of *Neurospora*.

Genetics 1953 : 38 : 702-03. (Abst.).

Further experiments have been carried out on

23 additional tryptophane-requiring (*td*) mutants (cf. *PBA*, Vol. XXIII, Abst. 136). From crosses involving all except three of the mutants, it has been found that the suppressor gene (*su*₂) previously reported affected only one strain (*td*₂) as in the earlier experiments. A second nonallelic suppressor, *su*₆, affected only *td*₂ and *td*₆ among the 13 mutants tested. A third suppressor, *su*₂₄, influenced only *td*₂₄. Tryptophane desmolase has been detected in the suppressed mutants; it appeared to be similar to the wild-type enzyme but desmolase activity in the suppressed mutants was lower than that of the wild type.

1670 GILES, N. H. & PARTRIDGE, C. W. H.

The effect of a suppressor on allelic inositolless mutants in *Neurospora crassa*.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 479-88.

A full account of investigations on a specific suppressor of the inositolless mutant 37401 is presented (cf. *PBA*, Vol. XXIII, Abst. 936).

1671 ATWOOD, K. C. & MUKAI, F.

High spontaneous incidence of a mutant of *Neurospora crassa*.

Genetics 1953 : 38 : p. 654. (Abst.).

In a series of spontaneous recessive lethal mutants obtained by the heterocaryon method, two occurred with a high frequency. Fifteen instances of each were found among the 2764 nuclei tested. The cultures from which the isolates were obtained had been maintained by mass transfer. Pedigree cultures were therefore established, each originating from a single conidium. The data at present available suggest that an intrinsically high mutation rate is one of the factors responsible for the high frequency of one of the mutants; the second has failed to appear in the pedigree cultures.

1672 MITCHELL, M. B., MITCHELL, H. K. & TISSIERES, A.

Mendelian and non-Mendelian factors affecting the cytochrome system in *Neurospora crassa*.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 606-13.

Three strains from a cross between untreated standard wild types exhibit differences from the wild type with respect to growth rate and cytochrome content, these differences being similar to those shown by the strain poky (cf. *PBA*, Vol. XXIII, Absts. 947 and 1737). In one mutant, designated mi-3, these differences are inherited maternally, as in poky; the differences between mi-3 and poky also appear to be inherited maternally. The characteristics

of the other two strains, C 115 and C 117, each depend upon a different mutant gene, situated in linkage group A in C 115 and in linkage group B in C 117. Strains C 115 and mi-3 both have a large amount of cytochrome c, although not as great as that in poky. Like the latter, they are also deficient in cytochrome a. The content of cytochrome b is normal in mi-3, and low in C 115 although not as low as in poky. Cytochromes a and c have not been detected in C 117, which has an excess of cytochrome b. The three strains grow more slowly than the wild type but faster than poky. Recombinants carrying one of the mutant genes and either the maternally inherited characters of poky or mi-3 showed the properties predictable from the characteristics of the individual components.

1673 SCHAEFFER, P.

**A black mutant of *Neurospora crassa*.
Mode of action of the mutant allele
and action of light on melanogenesis.**
Arch. Biochem. 1953 : 47 : 359-79.

The spontaneous occurrence of a colonial, nutritionally normal mutant, named "black," is reported. The mutant owes its blackness, developed by the aging mycelium, to the formation of a melanin. The black phenotype depends upon the mutation of a single gene, close to the centromere of the sex chromosome. The melanogenesis could be ascribed to increased tyrosinase activity. No conclusion could be made concerning the cause of this increased tyrosinase activity. Visible light, applied during the growth of the mutant, depressed both melanogenesis and tyrosinase activity.

1674 SRB, A. M.

**Shifts in heterocaryotic dominance
relations effected by modifier genes
in *Neurospora*.**

Genetics 1953 : 38 : p. 694. (Abst.).

Arginineless and lysineless mutants with identical genetic backgrounds have been obtained by treating wild-type conidia with ultraviolet rays and by using the technique of filtration followed by selective plating. Growth of arginineless mutants is inhibited by lysine, and lysineless mutants are sensitive to arginine. Heterocaryons between arginineless and lysineless strains occasionally grow on minimal agar medium at approximately the rate of the wild type. When conidia from such heterocaryons are crossed with the wild type, the relative frequencies of ascospores of the two mutant types indicate that the wild type of growth rate is achieved only when precise nuclear ratios are maintained. By plating irradiated conidia of an arginineless strain on a medium

to which arginine and an inhibitory concentration of lysine have been added, arginineless strains relatively insensitive to lysine can be selected. The recovery of lysineless strains relatively insensitive to arginine can be accomplished by an analogous procedure. In either case, mutation at a single locus has been found to be responsible for the alteration in aminoacid sensitivity. On minimal medium, heterocaryons between arginineless and lysineless strains carrying these modifiers nearly always show the growth rate of the wild type; the occurrence of this growth rate is not related to any particular nuclear ratio. The modifiers therefore affected the dominance relations between the two mutations and their wild-type alleles.

1675 DE SERRES, F. J. & GILES, N. H.

**Additional comparative studies of
reverse-mutation in inositolless
mutants in *Neurospora*.**

Genetics 1953 : 38 : p. 661. (Abst.).

The seven inositolless mutants whose spontaneous and ultraviolet-induced reversion was studied were found to be the result of mutation at the same locus as the eight inositolless stocks previously investigated (cf. Abst. 1676). The seven mutants differed markedly in their frequencies of reverse mutation and they included types corresponding to at least three of the five tentative classes of isoalleles established in earlier studies. The segregation of quantitative differences in reverse mutability was investigated in crosses of the temperature-sensitive inositolless mutant 83201 with a mutant (5202) having a high rate of spontaneous reversion and another (WS 7-366) which had not reverted, with or without ultraviolet treatment. Mutant 83201 was stable when untreated but reverted as the result of ultraviolet exposure. Comparisons of spontaneous or induced reversion rates in serial ascospore isolates from these two crosses demonstrated the regular segregation of differences in mutability.

1676 GILES, N. H.

**Studies of reverse mutation in
Neurospora crassa.**

Trans. N.Y. Acad. Sci. 1953 : Ser. 2 : 15 : 251-53.

Fifteen inositolless mutants, independently induced, have been found to be isoallelic and to differ in their reverse mutability, both induced and spontaneous (cf. Absts. 1675 and 1678). They include one temperature-sensitive mutant (83201). On the basis of their differences in reverse mutability, which segregate regularly at meiosis, they can be divided into

five distinct classes. A similar isoallelic situation has also been demonstrated in the case of the locus for purple adenineless mutants. With respect to their frequencies of induced reverse mutation, these mutants fall into at least two groups. Preliminary data indicate that control of the frequency of reverse mutation is autonomous, resulting from the condition of the locus in the particular mutant. Some evidence has been obtained suggesting that the inositolless mutant may be structurally compound.

1677 KOLMARK, G. & GILES, N. H.

Studies on chemical mutagens using the *Neurospora* back-mutation test.

Genetics 1953 : 38 : p. 674. (Abst.).

The mutagenic effects of a number of chemicals were compared by means of the above technique, chiefly using the purple adenineless mutant Stanford 38701. Among the epoxides tested, diepoxybutane was the most active. Considerable differences in activity were shown by certain substances structurally very similar, e.g. 1,2-monoepoxybutane produced 15 times as many mutants as 2,3-monoepoxybutane. Some dialkylesters of sulphuric acid were also tested. Even in low concentrations, dimethyl sulphate was found to be highly active. Appropriate analyses indicated that the reversions induced by the various chemicals resulted from back mutation of the locus for the adenineless condition; suppressor mutations affecting this locus either do not occur or are very infrequent. An adenineless and inositolless double-mutant was used for the simultaneous comparison of reversion rates at two different loci. Certain chemicals were markedly specific for the adenineless locus. This specificity was most notable in the case of diepoxybutane. The proportion of adenine : inositol reversions was 0.65 after ultraviolet irradiation, whereas after treatment with diepoxybutane the ratio was 494.

1678 PARTRIDGE, C. W. H. & GILES, N. H.

Comparative biochemical studies of allelic inositolless mutants in *Neurospora crassa*.

Amer. J. Bot. 1953 : 40 : 778-87.

Fourteen phenotypically similar but independently induced inositolless mutants and one temperature-sensitive inositolless mutant were compared in experiments on growth responses on various media, in tests for syntrophism and in chromatographic analyses of excretion products. Eleven of the inositolless mutants were definitely found to involve mutation at the same locus. The temperature-sensitive

strain possessed the only mutant allele demonstrated to be biochemically distinct. From previous experiments on the rates of reverse mutation it was possible to subdivide the whole group of mutants into several classes (cf. *PBA*, Vol. XXIII, Abst. 5 and Vol. XXIV, Abst. 1676). Attempts to classify individual mutants on the basis of growth rates and other biochemical properties were not, however, successful. The possible significance of several mutations at the same locus in the inositolless group is discussed. It is suggested that the locus is complex, induced alteration of any part being sufficient to block the normal functioning of the whole locus.

1679 RIZET, G.

Les phénomènes de barrage chez *Podospira anserina*. I. Analyse génétique des barrages entre souches S et s. (The phenomena of mutual aversion in *P. anserina*. I. Genetical analysis of mutual aversions between strains S and s).

Rev. Cytol., Paris 1952 : 13 : 51-92.

Two strains of *P. anserina*, differing in respect of a single gene, and designated S and s, were distinguished. When grown together on a solid medium, each strain exerted an inhibitory effect on the other at their point of contact. Crosses between S and s strains gave S and s^S, but no s, progeny. The new strain s^S showed no aversion to either parent strain and remained stable over long periods of vegetative and sexual reproduction. Occasional spontaneous reversions to s were, however, observed, this reversion spreading throughout the whole culture. It is assumed that the s^S strain carries the gene s unchanged, and that it is due to a cytoplasmic modification brought about by the gene S.

1680 HALBINGER, R. E.

El mejoramiento de las levaduras en la industria. (Breeding yeasts in industry).

Cienc. e Invest. 1954 : 10 : 83-85.

A brief summary is given of information on selection and hybridization of yeasts for industrial purposes, with a plea for the adoption of measures for yeast breeding in Argentina.

1681 JAMES, A. P.

Evidence of genetic segregation as a cause of sectoring in induced variant colonies of yeast.

Genetics 1953 : 38 : 670-71. (Abst.).

A galactose + strain of *Saccharomyces cerevisiae* mutated from the + to the - response with

frequencies approaching 2% when irradiated with 2537 Å ultraviolet, and a high proportion of the mutant colonies were sectored for + and - cells. The parent strain was found to be heterozygous for the gene conditioning galactose reaction, since it gave regular 2:2 segregations at sporulation. The + portions of the sectored colonies were apparently normal, but in 6 out of 10 cases yielded + segregates only, indicating the acquisition of homozygosity for the dominant gene. Negative portions, when sporulated, yielded - segregates only. Additional abnormalities in the sectored colonies have been observed: (1) clones from two - sectors failed to sporulate but showed a mating reaction indicating either haploidy or homozygosity of sex genes; (2) one + sector segregated as a polyploid heterozygous for both galactose reaction and sex. The occurrence of genetic segregation with high frequencies in irradiated cells, either through somatic crossing-over or disjunction of homologous chromosomes instead of sister chromatids, is regarded as the most plausible explanation of the sectored colonies. Sectored colonies have also arisen spontaneously; such aberrations may therefore be a naturally occurring source of genetic variation in yeast.

- 1682 PAGANO, J. E.
Inadaptación del *Saccharomyces cerevisiae* a la galactosa por influencia de grandes cantidades de glucosa. (**Nonadaptation of *S. cerevisiae* to galactose under the influence of large quantities of glucose**).

Cienc. e Invest. 1954 : 10 : 43-44.

A culture grown on a medium containing galactose but no glucose adapted itself gradually to the fermentation of galactose. No such adaptation took place when the medium contained glucose as well as galactose.

- 1683 KOSIKOV, K. V.
(**Laws governing the inheritance of enzymic properties of yeasts acquired as the result of directed variability**).
Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 150-96. [Russian].

Evidence on inheritance of acquired characters in *Saccharomyces globosus* and F_2 hybrids of *S. ellipsoideus* x *S. globosus* is discussed. Yeast strains trained for fermenting sucrose or maltose bred true when inoculated into media based upon sucrose or maltose respectively. Strains that had acquired the capacity for fermenting maltose competed with the initial strain. No competition was observed between

the strains that had become capable of fermenting sucrose and those that had not. Some cells with new enzymic properties gave segregates in respect of their capacity for fermenting definite sugars, others transmitted their acquired characters to all their progeny. Most yeasts remained constant in respect of their acquired properties when grown upon agar media containing other sugars and always transmitted their capacity for fermenting maltose to their progeny. However, in some strains fermenting sucrose, the properties were weakened or lost in later generations. The capacity for fermenting sucrose or maltose was transmitted to the F_1 when strains with an acquired capacity for fermenting these sugars were hybridized with the initial strains incapable of it. In each case the F_2 showed segregation similar to hybrids of *S. ellipsoideus* x *S. globosus*. Forms resembling *S. paradoxus*, *S. chodati* and *S. ellipsoideus*, and a new form that ferments sucrose and maltose but not raffinose, have been obtained experimentally from *S. globosus*.

- 1684 SUBRAMANIAM, M. K. & THIAGARAJAN, T. R.

The chromosome number of *Rhodotorula glutinis* and its probable significance.

Curr. Sci. 1954 : 23 : 18-19.

Rhodotorula glutinis var. *rubescens* was examined cytologically at the Cytogenetics Laboratory of the Indian Institute of Sciences, Bangalore. Indications are that it is a sterile diploid.

- 1685 MAJEED AHMAD & AZEEZ KHAN.
Polygametic zygotes as a source of polyploidy and irregular ratios in yeast.

Nature, Lond. 1954 : 173 : p. 133.

Two trigametic zygotes have been observed in *Saccharomyces carlsbergensis*, suggesting that the formation of polygametic zygotes may in some cases result in irregular segregation ratios.

- 1686 GILLILAND, R. B.
Identification of the genes for maltose fermentation in *Saccharomyces diastaticus*.

Nature, Lond. 1954 : 173 : p. 409.

The gene M_1 for normal, fast fermentation of maltose by *S. diastaticus* has been found to be identical with M_1 in *S. cerevisiae*. The gene M_s for slow maltose fermentation in the former species is distinct from each of the four genes for maltose fermentation in *S. cerevisiae*; it is therefore designated M_5 .

- 1687 PITTMAN, D. D. & LINDEGREN, C. C.
Population dynamics in the long-term adaptation of *Saccharomyces chevalieri* to galactose.

Genetics 1953 : 38 : 863-84. (Abst.).

S. chevalieri ferments galactose as the result of "long-term" period adaptation of six days. "Short-term" adaptive fermentation of galactose is accomplished in less than two days. About 7% of the cells are of the respiratory-deficient "petite" type and are unable to ferment pyruvate, acetate and formate. On galactose agar medium both normal and petite colonies produce galactose-fermenting papillae on a background of galactose-negative cells; the papillae on the normal colonies soon become confluent. Nearly one-third of the petite colonies contain no papillae. The papillae developed by the petite form do not undergo deadaptation to long-term fermentation: they are stable short-term galactose-fermenting and respiratory-deficient mutants. Short-term galactose-fermenting, respiratory mutants also arise. Long-term adaptation to galactose is the result of mutation and selection, but reversion to long-term adaptation was found to be due to the selective advantage of respiratory nonfermenters in glucose.

- 1688 PITTMAN, D. D. & LINDEGREN, C. C.
Long-term adaptation to the fermentation of galactose in *Saccharomyces chevalieri*.

Nature, Lond. 1954 : 173 : 408-09.

The results of investigations on the behaviour of *S. chevalieri* in adaptation to galactose are reviewed and recent work by the authors on petite and normal colonies is discussed (cf. Abst. 1687).

- 1689 OGUR, M., LINDEGREN, G. & LINDEGREN, C. C.

Respiration deficient yeasts.

Genetics 1953 : 38 : p. 680. (Abst.).

Inability to utilize lactate is associated with lack of respiratory ability caused by enzymatic deficiencies of flavoprotein and cytochrome. Respiration — diploids, from matings between respiration — and respiration + haploids, yield 4 respiration — clones, with other marker characters segregating in 2 : 2 ratios.

- 1690 BEVER, W. M.

Further studies on physiologic races of *Ustilago tritici*.

Phytopathology 1953 : 43 : 681-83.

Eight new races of *Ustilago tritici* are described, making a total of 19 races. Kawvale is resistant to all races. Race 1 is still the most prevalent.

- 1691 MCGINNIS, R. C.

Cytological studies of chromosomes of rust fungi. II. The mitotic chromosomes of *Puccinia coronata*.

Canad. J. Bot. 1954 : 32 : 213-14.

Nuclear studies of the sporidia of *P. coronata* showed that most had four though some had from five to eight nuclei. Three chromosomes were observed at metaphase. It is concluded that $n = 3$ and that this is the basic number for *Puccinia*. The possibility of other species arising by polyploidy is considered.

- 1692 SAPONARO, A.

Ricerche sulla morfologia di alcuni ceppi di *Botrytis cinerea* Pers. provenienti da località diverse dell'Italia. (Researches on the morphology of some strains of *B. cinerea* Pers. from different localities in Italy).

Boll. Staz. Pat. veg. Roma 1952 : 10 : 213-31.

The phenomena of variation in *B. cinerea* are discussed by reference to the literature, and an account is given of observations on 7 collections of the fungus from grapes in different localities in Italy. Significant differences between certain of the strains were detected with regard to conidial dimensions. With the exception of one race which gave rise to a mutant sector, the variations appear continuous and do not seem to have arisen abruptly as mutations.

- 1693 VISCONTI, N. & GAREN, A.

Unity of the vegetative pool in phage-infected bacteria.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 620-27.

By using phage T 2 labelled with different genetic markers for the first and second infections, it was found that the phages from both infections multiply and recombine with equal facility within the vegetative pool established by the first phage, and that the genetic markers introduced by the second infection are already represented in the first progeny appearing at the end of the normal eclipse period, i.e. the period in which only vegetative particles of phage are present in the bacterium. Since the second infection could occur as late as 8 minutes after the first, the eclipse period for the second phage was reduced to less than 4 minutes, in contrast to the normal period of 12 minutes.

- 1694 WEIGLE, J. J.

Induction of mutations in a bacterial virus.

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 628-36.

Ultraviolet-inactivated phage λ , when adsorbed

on to sensitive bacteria, was reactivated when a further dose of ultraviolet was given to the phage-bacterium complexes. The reactivated phages contained a fairly large proportion of mutants, producing plaques with marked morphological differences; some of the mutants were stable, whereas others gave rise to further mutants when subcultured. When the mutants were inactivated by ultraviolet and reactivated by ultraviolet-treated bacteria, they, in turn, usually produced other mutants. Each of the original mutants appeared to possess a characteristic pattern of mutation. No cases of spontaneous or induced reversion were detected. The action of the ultraviolet radiation upon both the phages and the bacteria was necessary for the appearance of the mutants. The data suggested that the ultraviolet radiation caused four types of damage to the phage particle: type 1 lesions not repairable by either ultraviolet or photoreactivation, type 2 lesions repairable by either of these two means, type 3 lesions repairable only by photoreactivation, and type 4 only by ultraviolet. Only damage of type 4 was associated with mutation.

- 1695 JACOB, F.
Mutation d'un bactériophage induite par l'irradiation des seules bactéries hôtes avant l'infection. (**Bacteriophage mutation induced by irradiating only the host bacteria before infection**).
CR Acad. Sci., Paris 1954 : 238 : 732-34.

Escherichia coli strain K 125 was exposed to ultraviolet rays and then infected with the nonirradiated phage strain λ_m . Up to four times as many phage mutants were obtained compared with phage from the nonirradiated control.

- 1696 SUHOV, K. S. & VOVK, A. M.
(**Development of a new "acicular" strain of the tobacco mosaic virus under experimental conditions**).
Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 265-69. [Russian].

An acicular strain of the tobacco mosaic virus was obtained by (1) inoculating young tomato plants grown in a dark room with the normal strain or (2) placing inoculated tomato plants in moist test tubes in a thermostat at 34.6° for 15 days.

- 1697 SIEGEL, A. L., RAPPAPORT, I. & WILDMAN, S. G.
Some natural relationships of strains of tobacco mosaic virus.
Genetics 1953 : 38 : p. 691. (Abst.).

Eight strains of tobacco mosaic virus have

been found to fall into four groups, characterized by colour, electrophoretic mobility, type of symptom produced in *Nicotiana sylvestris*, sensitivity to inactivation by ultraviolet light and antigenic constitution. The strains of a single group are identical in all these properties, except antigenic constitution, in which they differ slightly. Strains belonging to the same group show considerable differences in the symptoms produced in *N. tabacum*. Strains producing the local necrotic reaction in *N. sylvestris* differed from those capable of systemic infection with respect to one or more of the above properties, indicating a correlation between *in vivo* and *in vitro* properties. The strains studied provide a series of marker characters for investigating the possibility of genetic recombination among the plant viruses.

CROP PLANTS

- 1698 **Field crop varieties in Montana.**
Circ. Mont. agric. Exp. Sta. 1952 : No. 198 : Pp. 67.

Grain and forage crop varieties are recommended for Montana conditions. The brief descriptions of recommended varieties include regional adaptation, resistance to disease and origin.

- 1699 **List of varieties 1954.**
Windmill, The Hague 1953 : No. 12 : p. 12; also in French, 11-12; and German, 12-13.

Brief descriptive notes are given on the oat, grass, lupin, serradella, forage beet, potato, flax, pea and bean varieties included in the 1954 Descriptive List of Field Crops published in the Netherlands.

- 1700 BOERGER, A.
Puntos de vista acerca de la cibernética. (**Points of view about cybernetics**).
Cienc. e Invest. 1954 : 10 : 74-79.

Population figures for five continents are presented and shown to be not in accordance with the regular increase expected on the basis of cybernetics and the Malthusian doctrine. The gap between food and population is widening less rapidly than expected, partly, it is suggested, owing to improved methods of agriculture and the breeding of better varieties of crop plants.

- 1701 HOWARD, H. W.
Crops and plant breeding.
J.R. agric. Soc. 1953 : 114 : 90-106.

Recent work, chiefly in Britain, is surveyed. Among the topics considered are: the performance of varieties of malting barley; the new

barley Proctor (cf. *PBA*, Vol. XXIII, Abst. 1180); Swedish research on economically valuable mutants of barley induced by X irradiation; methods of breeding wheat; results of variety trials of wheat, oats and sugar beet; cytology and fertility of colchicine-induced intergeneric and interspecific hybrids involving *Triticum*, *Aegilops* and *Agropyron*; variation in kernel content of oats; tetraploid sugar beet; potato breeding for resistance to late blight and viruses; tests to discover sources of resistance to the potato root eelworm; the new potato variety Pentland Ace (cf. *PBA*, Vols. XXII, Abst. 2806 and XXIII, Abst. 975); and Dutch investigations on the polycross technique in breeding herbaceous species.

1702 KÖNNECKE, G.

Versuchsbericht 1950-1952. (**Report on experiments, 1950-52**).

Institut für Acker- und Pflanzenbau der Martin-Luther-Universität Halle-Wittenberg : Pp. 304.

This account of the activities of the experimental farms of the Martin Luther University, Halle, includes data on agronomic techniques and the results of variety trials conducted during 1947-52, with special emphasis on the period 1950-52. In addition to the crops mentioned below, the results of yield trials of leguminous and nonleguminous forage crops, poppy, mustard, rape, linseed, sunflower, pumpkin, beans, soya beans and peas, are given. A large number of varieties, especially of cereals, have been deleted from the East German approved list.

Wheat. Langensteiner Bastard II [Langenstein Hybrid II] gave the highest yield of grain of all winter wheats tested and was resistant to lodging and frost. Derenburger Silber [Derenburg Silver], with a slightly lower yield of grain than Langensteiner Bastard II, gave a considerably higher yield of straw. Hadmerslebener II and IV also gave high yields of grain and were the most drought resistant of the varieties tested. Data on the effect of various times of sowing on different varieties are given. Of the spring wheats tested, Peko gave the highest yields of both grain and straw and proved highly resistant to lodging. Koga, with a yield 14% below that of Peko, was considerably superior in baking quality.

Oats. Pfiffelbacher and Universal gave the highest yields of grain; Goldregen II [Golden Rain II] and Flämingsweiss [Fläming's White] had the highest yield of straw, combined with a high yield of grain.

Rye. Petkuser Normalstrohroggen [Petkus Normal-strawed rye] gave the highest yield in most areas and was resistant to drought, frost and lodging. In the Harz it was outyielded by Mecklenburger Marien.

Barley. Kleinwanzlebener Rekord, a new variety from the cross Dalmatinischer Winterroggen [Dalmatian winter rye] x Kleinwanzlebener 12, outyielded all other winter varieties, and was resistant to mildew and highly resistant to lodging. Of the spring barleys, Saalegerste [Saale barley] was the highest yielding and proved well adapted to poor soils and resistant to lodging. The yields of Freya, Haisa and Elsa were also considerably above the average for the trials as a whole. A number of X-ray-induced mutant strains of Haisa have been obtained; in some cases the yield is higher than that of the parent variety.

Mangel. Teutonia gave the highest dry matter and leaf yield per given area.

Swede. Crieuener Weiss [Crieuener White] had the highest yield of roots and dry matter per given area. It was resistant to drought.

Potato. Of the early varieties, Frühbote [Early Messenger] and Frühmölle gave the highest yields. Vera did not degenerate as rapidly as other varieties as the result of virus infection. Of the medium-early varieties, Wega gave the highest yields. Sirius also produced high yields and had a considerably higher starch content than any other variety and was also least susceptible to degeneration. Of the late varieties, Capella and Aquila proved the highest yielding.

The relative starch content and starch yield per ha. of all varieties tested are tabulated. Trials were conducted to determine which areas are most suitable for the cultivation of seed; Mecklenburg and the Altmark appeared best adapted to this purpose. Varietal differences in susceptibility to virus attack are listed and the results of varietal differences in germination, reaction to fertilizer and different depths and distances of planting are given.

Carrot. Of fodder carrots tested, Rheinischer Riesen [Rhenish Giant] gave the highest yields.

1703 WELLER, K.

50 Jahre bayerische Pflanzenzüchtung. (**50 years of plant breeding in Bavaria**).

Landw. Jb. Bayern 1954 : 31 : 56-69.

The contents of a speech given on 29 June 1953, on the occasion of the fiftieth anniversary of the founding of the Bavarian Plant Breeding Institute, Weißenstephan, are reported. An

account of the history and work of the Institute is given; at the present time emphasis is being laid on the artificial induction of mutations and the creation of inbred lines of cereals to exploit heterosis. Breeding for high gluten content in wheat and for disease resistance in cereals, grasses and leguminous forage crops is giving satisfactory results (cf. *PBA*, Vol. XXIII, Abst. 2465).

1704 Bericht über die Arbeitstagung 1953 der "Arbeitsgemeinschaft der Saatzucht-leiter" im Rahmen der "Vereinigung österreichischer Saatgutzüchter." (**Report on the 1953 meeting of the working party of the principal seed producers within the framework of the Association of Austrian Seed Producers**).

Admont, 1953 : Pp. 232. (Mimeographed).

The following articles of interest to plant breeders are included in the report of the above meeting, held in Admont on 22-24 January, 1953.

Pichler, F. *Über die Anfälligkeit verschiedener Getreidesorten gegen Krankheiten.* (*On the susceptibility of different cereal varieties to diseases*). (pp. 5-14).

The importance of breeding for disease resistance in cereals is stressed, and tabulated data are presented on varietal differences in susceptibility. Of wheats cultivated in Austria, Kadolzer Z, Kadolzer P, Wieselburger Kolben [Wieselburg Club], Tiroler Binkel and Probst-dorfer Manitoba are the most resistant to bunt. The imported American varieties Comanche, Wester CI, Pawnee and Triumph also display a high degree of resistance. The wheats Admonter früh [Admont Early] and Janetzski's früher [Janetzski's Early] and the barley varieties Harriet, Bayerngerste [Bavarian barley] and Otterbacher are almost immune to loose smut. The summer barley Bayern [Bavaria] is highly resistant to mildew.

Fuchs, H. *Wünsche und Forderungen der Mühle an die Getreidezucht.* (*Wishes and requirements of the milling industry in cereal breeding*). (pp. 42-51).

A plea for new varieties of better milling and baking quality is made. An increase in gluten content, husks of a lighter colour and varieties that do not shed their grain easily are required.

Hänsel, H. *Klonzüchtung bei Winterroggen.* (*Clonal breeding in winter rye*). (pp. 52-66).

Up to three hundred plants may be obtained

from one initial seedling by vegetative propagation, thus providing the breeder with a stock of plants of exactly the same genetic constitution. The importance of this in making parallel crossings, otherwise impossible because of the heterozygous nature of rye, is emphasized.

Demel, J. *Sortenprüfung und Sortenanerkennung von Kartoffeln in Deutschland und Holland.* (*Testing and certification of potato varieties in Germany and Holland*). (pp. 67-75).

An account of the testing and registration of potatoes in Germany and Holland is presented, together with details of the standards required before a given variety is placed on the approved list.

Pammer, F. *Probleme des Futterpflanzen-Saatbaues und der Futterpflanzenzüchtung (Eindrücke aus Süddeutschland).* [*Problems of forage plant seed culture and forage plant breeding. (Impressions from South Germany)*]. (pp. 76-92).

An account of the breeding and testing of varieties of forage grass, lucerne and clover in South Germany is presented. In trials at Weißenstephan, Bavaria, native strains of lucerne and clover have proved superior in hay and protein yields to imported varieties. The importance of choosing varieties adapted to the conditions under which they are to be cultivated is stressed.

Klages, H. W. *Züchtungsfragen in den USA.* (*Breeding problems in the USA*). (pp. 121-34).

A popular account of plant breeding in the USA is presented and particulars of research organizations and of the testing and propagation of new varieties are given. At the present time, special attention is being paid to breeding varieties suitable for mechanical harvesting.

Pammer, F. *Versuchsbericht—Luzerne-Sortenversuche und Zeitstufensaat.* (*Report of trials. Tests of lucerne varieties and graduated sowing times*). (pp. 152-57).

In trials conducted at Fuchsenbigl, Lambach and Grabbenegg in 1950-52, Du Puits, Socheville and Marchfeld gave the highest yields.

Zürn, F. *Erträge der Zuchtsorten von Leguminosen und Gräsern.* (*Yields of pedigree varieties of grasses and leguminous crops*). (pp. 158-203).

Data on the comparative yields of hay and protein and mineral contents are presented for varieties of the following forage plants cultivated in Austria: cocksfoot, ryegrass, red fescue,

meadow fescue, timothy, *Avena elatior*, lucerne and white, red and Alsike clover.

Jähnl, G. *Mitteilungen über Hackfruchtversuche* 1952. (*Communications on root crop trials*, 1952). (pp. 204-12).

The results of variety, irrigation and fertilizer tests, conducted with potatoes and sugar and forage beet at Admont, are given. Of the early varieties of potato, Böhm's Allerfrüheste [Böhm's Earliest of All] and Sieglinde gave the highest yields. Ackersegen, Agnes and Voran yielded best among the late varieties.

Bock, H. *Eindrücke von einer Studienreise in Schweden und Dänemark*. (*Impressions from a study journey in Sweden and Denmark*). (pp. 213-28).

A general account of the sugar beet industry in Sweden and Denmark is given, together with details of the breeding programme and diseases from which the crop suffers.

Åkerman, Å. *Über die Resultate der Futterpflanzenzüchtung des schwedischen Saatzüchtvereins*. (*On the achievements in forage plant breeding of the Swedish Seed Growing Association*). (pp. 229-32).

Varieties of *Poa serotina*, smooth-stalked meadow grass, cocksfoot, ryegrass, meadow fescue, timothy and white, red and Alsike clover developed in Sweden are described.

1705 KARNER, L.

Ergebnisse der Gemüsesortenversuche des Jahres 1952. (**Results of vegetable variety trials during 1952**).

VersErgebn. Bundesanst. alp. Landw., Admont 1953 : No. 22 : 1-26.

Tabulated data on the results of variety trials conducted at Admont and at other centres in the Steiermark, Carinthia and the Salzburg area are presented. Among the crops tested were beetroot, kohlrabi, sweet pepper, carrots, radish, cabbage, cauliflower, lettuce and peas. Information on maturity, quality and tendency towards bolting are included.

1706 (Survey of scientific research in plant breeding in the post-revolution period).

Za socialist. sel'skokochozjaistv. Nauk. (For socialist agric. Sci.). Praha 1954 : Ser. A : No. 1 : 20-32. [Russian].

Recent Mičurinite research in Czechoslovakia with wheat, oats, rape, hemp, vegetables and fruit trees, besides the crops listed below, is mentioned.

Maize. Heterosis in Belyi Zub Zaička [White Dent Hare] x Slovackaja Želtaja [Yellow

Slovak] amounted to 13.6-37.1%. Selection work with inbred lines has begun.

Barley. Breeding for drought resistance and good malting properties is in progress. A new six-rowed winter barley of good malting quality was obtained by distant hybridization involving Peragis and Yugoslav and Caucasian forms. It is early, hardy and yields 31.1 c. per ha.

Potato. Resistance to scab, wart and *Phytophthora* has been investigated. Breeding for higher yield and increased starch content is in progress.

Flax. Productive dual-purpose varieties have been obtained by wide crosses involving fine fibre flaxes of northern origin and some Moroccan linseed varieties. For instance, Šumperské Novum yields 99.5 c. stems and 10 c. seed per ha.

Sugar beet. Crosses of some domestic varieties with *Beta trigyna* or *B. maritima* have given drought-resistant material suitable for combine harvesting.

Hop. Breeding and training for good quality and late maturity are mentioned. New clones, including Oswald 31, 72 and 114, have been selected from Czechoslovak material on the basis of their yield, vigour, uniform shape of cone and quality. They outyield previously cultivated types by 30%.

1707 CÂMARA, A.

Procurando novas directrizes para o melhoramento de plantas. (**Searching for new directions in plant breeding**).

Rev. agron., Lisboa 1945 : 33 : 297-320.

In a lecture given in September 1944 the author outlines the work of the Estação Agronómica Nacional [National Agronomy Station] in Portugal. Among the subjects dealt with is the induction of mutants in *Triticum monococcum* by treatment with X rays and high temperature, from the results of which it is concluded that the method is not without interest for practical breeding; the distal arms of the SAT chromosome display the greatest susceptibility to fragmentation. Chromosome variations have been produced also by centrifuging. Further evidence has been obtained of polysomaty in the so-called diploid wheats and the chromosome number $2n = 14$ is thought to be derived from a triploid hybrid, $2n = 15$, between an original diploid with $2n = 10$ and an autopolyploid with $2n = 20$. Polysomaty is thus considered to be an important factor in evolution and experiments were designed to test the possibility of inducing it; a slight increase has been produced by CO_2 treatment in *Drosophila*

and other gases are being tested. Experiments with *Aloe arborescens* and other species have shown that nondisjunction is more frequent in the short than in the long chromosomes.

A method of breeding is proposed which consists of crossing each successive generation of plants back to plants obtained from grains saved from the original selected ear. The possibilities of creating pure lines by means of haploids are also considered.

1708 KRESS, H.

Deutsche Agrarwissenschaftler berichten aus der Sowjetunion (X). Fragen der Pflanzenzüchtung. [German agronomists report from the Soviet Union (X). Questions of plant breeding].

Dtsch. Landw., Berl. 1953 : 4 : 626-29.

An account of Soviet plant breeding methods is presented. The technique by which spring wheats are said to have been converted into winter wheats by shattering their former hereditary constitution and building a new one by means of autumn sowing and photoperiodism is described. Considerable success with vegetative hybridization of both potato and soft fruits is reported. In sexual hybridization, special attention is being paid to intergeneric crosses. In mixed pollination experiments with cotton, F_1 plants were obtained which combined characters inherited from the maternal parent with those from two paternal parents.

1709 HERTZSCH.

Max-Planck-Institut für Züchtungsfor-
schung (früher Kaiser-Wilhelm-Institut)—
Erwin-Baur-Institut—am 29.9.53. 25
Jahre. [Max Planck Institute for
Experimental Breeding (formerly the
Kaiser Wilhelm Institute)—Erwin
Baur Institute—the 25th anniversary
on 29.9.53].

Züchter 1953 : 23 : p. 371.

An account of the history and work of the Max Planck Institute for Experimental Breeding, Voldagsen, is given. In the 25 years of its existence, the institute has conducted experiments into the mechanism of heredity with *Antirrhinum*, *Epilobium* and bacteria. On the practical side it numbers among its successes the creation of the sweet lupin and the breeding of potato varieties resistant to late blight and cereal varieties resistant to rust and mildew. Breeding of potatoes resistant to viruses and blight is in progress.

The institute's collection of cultivated plants is one of the most comprehensive in the world, and breeding experiments with almost all cultivated crops are in progress.

1710 ĖĖHFEL'D, E. [Editor].

Collected papers on research at the Puškin laboratories of the USSR Institute of Plant Industry. (On the occasion of the twenty-fifth anniversary 1922-1947).

Leningrad 1949 : Pp. 282. [Russian].

This symposium constitutes a survey of research at Puškin from 1922 to 1947 and includes the following articles of interest to breeders.

Zarubailo, T. Ja., Ivanov, N. P., Kovalenko, G. M., Krasočkin, V. T. & Sizov, I. A. (Summarized reports on studies of the initial material and breeding research with economic plants at the Puškin laboratories of the USSR Institute of Plant Industry). (pp. 67-92).

Cereals. Descriptions are given of early and rust-resistant wheat varieties, oats with large grain or showing resistance to pests and crown rust, a variety of rye resistant to lodging and barleys noted for their resistance to lodging and loose smut.

Lupin. Varieties reaching maturity under Leningrad conditions have been developed.

Mangels. Material showing resistance to diseases and bolting is described.

Potato. Interspecific hybrids combining wart resistance with resistance to *Phytophthora* have been obtained.

Flax. Varieties noted for high fibre yield, resistance to lodging and indehiscent seed capsules have been developed.

Vegetables. Mention is made of several root vegetables interesting for their good keeping properties and resistance to bolting, a high yielding cabbage variety forming firm heads, large-seeded peas and beans, a large-fruited cucumber and early tomatoes.

Sizova, M. A. (Heritable changes in potato plants obtained from the supplementary buds of tubers). (pp. 187-94).

Plants developed from the inner layers of the tuber showed changes in respect of tuber colour, starch content, skin structure, keeping properties and leaf shape. In some varieties the changes were heritable; in others later generations reverted to the initial type. The changes are explained by the heterogeneity of the tuber tissues.

Česnokov, P. G. [Areas in which frit fly (*Oscinella frit*) causes widespread damage and the resistance to it shown by the principal spring wheat varieties in the USSR]. (pp. 195-222).

A list of hard and soft wheat varieties resistant

to the above pest in one or more climatic zones is given.

Letova, M. F. (Methods of artificial infection of cereals with loose smut). (pp. 223-32).

Of 16 varieties of oats tested by the Reed method, Mesdag, Markton, *Avena byzantina* var. *macrotricha* f. *nigra*, originating from Algiers, and *A. strigosa*, introduced from Spain, showed a high degree of resistance to loose smut.

Kovalenko, G. M. (The use of Solanum demissum in potato breeding). (pp. 233-48).

S. demissum, noted for its hardness and resistance to *Phytophthora*, crossed readily in direct and reciprocal crosses with many domestic varieties. Some back crosses have also been successful. Compatibility, fertility and productivity in the F_1 and F_2 varied according to the variety of *S. tuberosum* used. Most F_1 generations had intermediate characters or resembled *S. demissum*, but in some hybrids *S. tuberosum* was dominant over the wild species. Young F_1 hybrids from direct and reciprocal crosses usually resembled the pollen parent. Some hybrids, involving such varieties as Early Rose, Courier, Lorh, Seydlitz, Katahdin, Fürstenkrone, Golden Globe, Triumph and Tuno gave high tuber yields in the F_1 , others, notably some hybrids of Epicure and Centifolia, showed continuous improvement in productivity in later generations.

Kohanovskaja, L. N. (Embryological investigations into the causes of low seed set in some interspecific crosses of the potato). (pp. 249-53).

Embryological analyses of hybrids between *Solanum demissum*, on the one hand, and *S. antipoviczii*, Majestic, Epron and Doon Early, on the other, suggest a condition inside the embryo sacs of *S. demissum* responsible for a premature interruption of the fertilization process or development of embryos.

Krasoćkin, V. T. & Lizgunova, T. V. (Vegetable varieties bred at the Puškin laboratories of the USSR Institute of Plant Industry). (pp. 271-82).

Beet. Egipetskaja Ploskaja 18 [Flattened Egyptian 18], noted for its earliness, good flavour and resistance to bolting under Leningrad conditions, and Crosby 221, which reaches seed maturity 7-10 days earlier than Egipetskaja [Egyptian], have been selected. Crosby 221 keeps well and shows resistance to disease.

Carrot. Puškin Chantenay is a new variety producing short roots of good flavour and high vitamin A content.

Radish. Virovskii [Institute of Plant Industry] has been selected from Chinese material. It shows resistance to bolting and produces large white roots of good quality.

Cabbage. New varieties interesting for their high yield and good keeping properties include Zolotoi Gektar 1432 [Golden Acre 1432] and Njjuarkskaja 1133. Both have well-formed heads. Ladožskaja DS 8395 [Ladoga DS 8395], selected from local material, is a high-yielding midseason type with firm heads of good quality.

Cucumber. Tepličnyj 23 [Glasshouse 23], which is earlier and more productive than Klinskii, has been developed. It produces large parthenocarpic fruits of good eating quality.

Tomato. Two early greenhouse varieties, Puškin and Urožajnyj [Productive], have been selected. The former gives a bigger first crop than Bison. Urožajnyj, selected from a hybrid population of Alpatjeva Štambovyj [Alpatjev's Determinate] x Bison, is as early as Puškin and more productive. However, it is susceptible to *Phytophthora* and the quality of its fruits is inferior to that of Puškin.

1711 (At the USSR Institute of Plant Industry).

Sad i Ogorod (Gdn. & Veg. Gdn.) 1953 : No. 12 : 61-63. [Russian].

An account of vegetable breeding in Leningrad is given. Varieties developed in recent years include potatoes resistant to wart, cabbages interesting for their earliness and high yield and productive indoor cucumbers with good quality fruits. Several new indoor and outdoor tomato varieties are notable for their high yield and good flavour.

1712 TÖRNQVIST, G. I.

Om verksamheten vid Sveriges Utsädesförenings Övre-Norrlandsfilial 1937-1952. (On the work of the Upper Norrland Branch Station of the Swedish Seed Association, 1937-52).

Sverig. Utsädesfören. Tidskr. 1953 : 63 : 545-55.

In this address to the Swedish Seed Association, the above station is described, with a brief review of the crop plants that have been added from time to time to the breeding programme. Mention is made of some useful land barleys, the disease resistant Bottnia land rye, which should be of value as breeding material, and the polyploid Sirius turnip (cf. Abst. 1204).

- 1713 WALLER, E.
Västgötafilialens utveckling och några av dess mest aktuella arbetsuppgifter. (**The development of the Västgöta Branch Station and some of its most urgent tasks**).
Sverig. Utsädesfören. Tidskr. 1953 : 63 : 517-26.

Addressing the Swedish Seed Association annual meeting at Skara in July 1953, the speaker reviewed the work of the station, referring in particular to the breeding of cereals, legumes, herbage plants, root crops and oil plants (cf. *PBA*, Vol. XXI, Abst. 1801 and Vol. XXIII, Abst. 251).

- 1714 ÅKERMAN, Å.
Något om metoder vid och resultat av Utsädesföreningens förädlingsverksamhet. (**Something about the methods used in and the results of the breeding work of the Seed Association**).
Sverig. Utsädesfören. Tidskr. 1953 : 63 : 527-29.

In this address at the Swedish Seed Association meeting in July 1953, an outline was given of the development and aims of the work of the association in the breeding of agricultural crop plants. Special mention was made of the advances resulting from the application of hybridization and induced mutation and polyploidy (cf. Abst. 141).

- 1715 LAMPRECHT, H.
Arbetsplan för Weibullsholms Växtförädlingsanstalt för år 1954. (**Research programme for the Weibullsholm Plant Breeding Institute for the year 1954**) : 1953 : Pp. 41.

Compiled on the same lines as in previous years (cf. *PBA*, Vol. XXIII, Abst. 980), the current report comprises: Section I dealing with variety trials and local trials of breeding material, the cytological laboratory and seed control; Section II concerning cereals, meadow and pasture plants, peas, oil crops, maize for silage, and root crops; and Section III dealing with legumes, brassicas, dill, cucumbers, leeks, melons, carrots, parsnips, parsley, radishes, garden beet, lettuce, celery, spinach and tomatoes.

- 1716 Pajbjergfondens Forsøgs- og Forædlingsarbejde 1952. (**Experiments and breeding operations of the Pajbjerg Foundation in 1952**) : Pp. 59.

This progress report (cf. *PBA*, Vol. XXIII,

Abst. 1786) includes the following information:—

Winter wheat. Breeding operations comprised (1) further testing of 35 lines from various crosses and the sowing of numerous lines and hybrid populations for observation; and (2) a large scale test at Abildgaard of the resistance of commercial varieties to oat eelworm. Three out of the 35 lines were included in official trials and the yields of grain in hkg. per ha. for 1952 were 48.8 for 63/157, 53.4 for Kongehvede II [King wheat II] and 51.9 for Kongehvede III, while the corresponding averages for 1951 and 1952 were 39.4, 42.7 and 40.9. Eroica, the control, yielded 45.7 hkg. per ha. in 1952 with an average of 38.7 for 1951 and 1952.

The evaluation of the eelworm experiment presented some difficulty, but Eroica and Jubile [Jubilee] both gave better yields than the other varieties, when the previous crop was ryegrass instead of oats; and Kongehvede II and Alba seemed to have slightly fewer cysts per plant than the other varieties.

Oats. Testing was continued of (a) lines from new crosses and (b) the collection of varieties leaving the breeder's hands. In group (b) Rex and Regent ranked first in grain yield. Effects of increased rate of sowing and of heavier potassium nitrate manuring upon the varieties Rex, Regent and Minor as compared with Staal [Steel] are recorded. In average crude protein content for 1951 and 1952, Minor came first, with 9.25% with light manuring and 10.08% with heavy manuring. In yield of crude protein, however, Regent was first, with 338 kg. per ha. with light manuring, while Staal came first with 400 kg. per ha. when manuring was heavy.

Rex is to be released for sale in Denmark and also in Sweden, where it has been tested with good results.

Rye. In three experiments in a polycross layout, several families surpassed the controls Petkus and Kongsrug II [King's rye II] in yield. The straw is, however, too long in this material and efforts to obtain very short-strawed lines from a cross between rye and wheat are being pursued. Work on polyploid rye was continued.

Barley. Sowings included (a) varieties whose breeding has now been completed, (b) lines from recent crosses and (c) pure culture lines of Kron [Crown] and Drost. Only group (a) is discussed. Tables covering 1947-52 are given showing grain yields, the effects of potassium nitrate

manuring on yield, 1000 corn weight and crude protein content. The figures for 1952 confirmed the superiority of Drost, which yielded 4-6% more grain than Fero, Freja, Kron, Maja or Herta. Fero showed the greatest capacity for utilizing potassium nitrate, and Freja the lowest, the increase in yield from manuring being 10.3% for the former and 8.7% for the latter.

The new variety 81/10 has constantly out-yielded Maja, but does not equal Drost, though superior in stiffness of straw. It appears suitable for use as a malting barley.

In tests of resistance of barley varieties to the oat eelworm, marked differences were found in the number of cysts on the roots, but, though the count was low for Fero and Kron, neither variety showed a commensurately high yield of grain, while Drost, with a similar low number of cysts showed a comparatively high yield.

Herbage plants. Work on red clover, white clover and various grasses was continued.

Beets. Some tests of strains and breeding material of sugar beet were carried out, but work was mainly concentrated on yellow sugar mangels. Methods of raising polyploid beets were also studied with good results, in spite of unfavourable weather. Greenhouse experiments on monogerm seed and pollen-sterile beets were carried on.

A general account of mangel breeding methods is given, special emphasis being laid on the polycross method. Statistical data showing results obtained by polycrossing from 1942 to 1951 are included, and the limitations of the method are indicated.

Swede. A list is given showing the various steps in breeding during 1942-52, the material being derived from (a) Bangholm Pajbjerg x Bangholm Wilby Øtofte IX and (b) (Bangholm Pajbjerg x kohl rabi) x Bangholm Wilby Øtofte IX. By 1940, the F₁ generation of the swede x kohl rabi cross, made in 1931, yielded, in a trial with Bangholm Pajbjerg, 865 hkg. of roots and 119.4 hkg. of dry matter per ha., as compared with 970 and 115.4 respectively for Bangholm Pajbjerg; and the dry matter content was 13.8% as compared with 11.9% for Bangholm Pajbjerg. Resistance to cabbage top was good in both the crosses with Bangholm Wilby Øtofte IX, and especially in the hybrid material which had included kohl rabi at an earlier stage.

A table is given showing the performance of Bangholm strains and families during 1945-52 at various stations.

1717 Rassenlijst voor Landbougewassen 1954. (**Variety list of agricultural plants 1954**).

Meded. Ned. Alg. Keuringsdienst Landbouwzaden Aardappelpootgoed 1954 : 10 : p. 71.

Recently approved varieties of lupin, potato, flax, bean, pea and other crops are listed, together with morphological data, details of yield and disease resistance, and particulars of breeders and seed producers.

1718 AMELUNG, J.

Plantenveredeling en productiviteitsverhoging in de akkerbouw. (**Plant breeding and increased production in agriculture**).

Landbouwk. Tijdschr., 's-Grav. 1954 : 66 : 189-91.

An account of increases in yield during the period 1951-1953 due to the cultivation of improved varieties of crop plants in the Netherlands is given, and future possibilities are outlined (cf. *PBA*, Vol. XXII, Abst. 2534).

1719 PRJADČENKU [PRIADCENCU], A.

(**Prospects of improving economic plants in the Rumanian Democratic Republic**).

Zemledelie (Agriculture) 1954 : No. 1 : 93-104. [Russian].

Breeding experiments in Rumania with rye, sugar beets and mangels, legumes, linseed and sunflower, besides the crops referred to below, are reported.

Wheat. New winter standards, many noted for their high yield and good grain quality, are described. Some are hardy and drought-resistant, others show resistance to rust or lodging. The Soviet spring wheat *Lutescens* 69 has outyielded all others in most districts. Ikar 142, interesting for its vitreous grain and resistance to rust and loose smut, and a lodging-resistant variety 48 are mentioned. Some forms combining hardness with earliness, productivity and rust resistance have been obtained by crossing A 26 and A 15 with the Soviet wheats *Hostianum* 237 and *Ukrainka*. A 15 has been improved by intravarietal pollination. The best pollen mixtures for multiparental hybridization of spring and winter wheats have been found. Interspecific hybridization, involving crosses of wheat with rye, *Aegilops* or *Agropyron glaucum*, and experiments on grafting wheat embryos on rye, oat or barley endosperms are in progress.

Oat. A new variety, Tyrgu-Frumos 9, which yields more grain than Cenad 88, has been

developed. Cenad 88, noted for its high yield and resistance to rust, is the standard for all districts except those in which it is less productive than Ikar 878. Other varieties are being improved by pollination with mixed pollen.

Maize. A new high-yielding late dent, Ikar 54, and some early and mid-season varieties, noted for their good quality kernels and productivity, are mentioned. Many hybrids, some outyielding the standard by up to 38.7%, others combining earliness with high yield, have been obtained. Rumynskaja [Rumanian] has been selected on the basis of its high yield.

Barley. The standards include a hardy Soviet winter barley, Odessa 17, a Czechoslovakian spring barley, Hanna Kurgin, which is adapted to humid climate, and two new productive two-rowed spring barleys Tyrgu-Frumos 240 and Cluj 123, the latter being early and drought-resistant. Other spring barleys are being improved by pollination with the mixed pollen of the above named varieties.

Potato. Several wart-resistant varieties including Rozovyi Osennii [Pink Autumn] originating from Moldova and Sapunarj from the Stalin province are listed. The former is noted for its high yield and good keeping properties and the latter for its good flavour. Breeding research includes Mičurinite experiments on sowing in summer and directed changes by vegetative hybridization.

Fibres. Two early cotton varieties, Odessa 1 and Čirpan 39, have been introduced from Russia and Bulgaria respectively. The former proved highly productive under Rumanian conditions. A Soviet flax variety Tekstilščik [Textile Worker] has also given good results in the trials. A new hemp variety Ikar 42/118 has outyielded the former standard. A high-yielding variety of *Abutilon*, Ikar 3, and a productive drought-resistant variety of kenaf, Ikar 2, have been selected.

1720 Report of the Bose Institute for 1951-52 : Pp. 69.

Potato. Virus A has so far not been found in the variety Red Round and it is field immune to virus B. *Solanum simplicifolium* is field immune to viruses A, Y and C and *S. brevimucronatum* to virus X. Progenies with dominant genes for field immunity have been raised. *S. polyadenium* is reported resistant to aphids transmitting virus Y. It is confirmed that White Round is highly resistant to leaf roll.

Cotton. Allowing cotton plants to remain in

the ground for a second year resulted in a lower yield of poorer quality and caused an increase in pests and diseases. Irradiated types retained the increase in lint length and ginning percentage that they had shown the previous year. Selected types irradiated this year appeared more vigorous and had bigger bolls. Hybrids of tree cottons and economic types such as 920, 4F and LSS withstood pests and diseases in their second year in the field, and gave higher yields but had coarser lint. Back crosses have been attempted to improve the lint.

Jute. Seeds of *Corchorus capsularis* 'D154' and 'D386' and *C. olitorius* 'CG', 'R26' and a tall mutant were X-irradiated with doses varying from 28 to 60 m.a.H. The greatest increases in height were found in plants from seed treated with 60 m.a.H. Irradiated seeds also gave plants with a shorter flowering period and a greater number of bifurcations, the latter increasing with the size of the dose. *C. olitorius* types showed greater bifurcation than *C. capsularis* types. Tests for earliness of flowering continued. Anatomical studies showed that the tall mutant had a larger number of thinner fibres than R26.

Seeds from plants which were given saline treatments last year were subjected to them again. The general behaviour of the plants was considered better than in the previous year and *C. capsularis* again appeared more tolerant of saline conditions than *C. olitorius*.

Sesame. Progeny of eight X-irradiated plants which had grown well the previous season were studied. The yield of the X-irradiated progenies was generally greater than that of the controls. The higher yielding plants of the X_1 generation continued to yield well in the X_2 . Early-flowering types, which included all the Berhampore types, were selected. In general, sterility increased with the dosage of the treatment and pollen grains and seeds tended to be larger in the treated plants.

Coconut. In studies of the development of the endosperm no free nuclei were found before the kernel was deposited. Both the cellular tissue and free nuclei grow by somatic division. Nuclei with 80 chromosomes were observed ($2n = 32$).

Rape and Mustard. Rai 5, Tori 7, Mustard 325 and RL 9 were X-irradiated with doses from 50 to 140 m.a.H. In general all treated plants gave a higher number of fruits than the controls, the number increasing with the size of the dose.

1721 Report of the Bose Institute for 1952-53 : Pp. 78.

Potato. Breeding for resistance to viruses X, Y and leaf roll has continued. Field immunity in potatoes from South America to mosaic viruses X, Y, A and C is controlled by the single dominant genes N_X , N_Y , N_A and N_C respectively. The variety Bismark is being used as a source of quantitative resistance to leaf roll; the USDA seedling 41956 is immune to virus X. Selected diploid plants with the resistant characters have been crossed with hexaploid *Solanum demissum* to obtain tetraploids combining resistance to viruses and blight. *S. simplicifolium* is resistant to local strains of blight. The progeny MD 1821 (a) appears resistant to leaf roll, field immune to virus Y and immune to virus X. Further work being carried out includes the incorporation of disease resistance into commercial stock and studies of the inheritance of immunity to virus diseases in diploid species.

Cotton. Out of 401 strains, 38 found to be better under Falta conditions were studied and the results tabulated with regard to lint length, ginning percentage, number of days to first flush, average yield and yield of the best plant. In irradiation experiments, seven varieties were exposed to doses of from 6 to 9 m.a.H. Ginning percentages and yields were increased in most cases, CO 2 giving the best results in both respects. The F_2 generation of hybrids produced by crossing the tree cotton as the male parent with such economic hybrid strains as 920 x 4 F (F4) 920 x LSS (F4) was studied. The vegetative characters of these hybrids were more like the female parent and flowering was earlier. The bolls remained large and tapering. Back crosses to the female parent to improve fibre quality are being made. Studies of the chromosome morphology of five Asiatic cottons, C-11-2, KI, 7070, 7067 and 7036, showed that C-11-2 had six nucleolar chromosomes while KI, 7070 and 7036 had four.

Jute. *Corchorus olitorius* types Chinsura Green (CG), R 26 and a tall mutant and *C. capsularis* types D 154 and D 386 were irradiated for 80 and 125 m.a.H. Plants resulting from these treatments and from seed of last season's promising X_1 plants were studied with regard to height, basal diameter and flowering period. Significant increases in height occurred in R 26 and CG whilst the *C. capsularis* types did not respond so well. In all types except CG, treatment resulted in a shorter flowering period. Selections of early flowering types of the tall

mutant all flowered considerably earlier than the original selection and maintained their height and basal diameter. Other selections for early flowering, obtained by irradiation, maintained the character in the next generation. The X_2 of D 154, D 386 and the tall mutant had a later, though shorter, flowering period than the X_1 . R 26 and CG had a longer flowering period in the X_2 . R 26 and D 154 plants of abnormal morphology were isolated after X irradiation. The 26 plants died prematurely. D 154 plants had low seed set in each generation. The chromosomes appeared sticky and meiotic irregularities and cytotoxicity were common. Cytological studies of early-flowering types showed meiosis to be fairly regular though nondisjunction occurred in all varieties to a certain extent.

Seeds sown in plots previously irrigated with saline water and irrigated again on the 30th day from sowing had a low survival and those previously soaked in salt solution were abnormal in growth. The survival after only one irrigation of the plant on the 30th day after sowing was 60-70% for *C. capsularis* types and 40-45% for *C. olitorius* types.

Sesame. Bengal types 10, 12, 16 and 20 and Madras types TMV 1 and 2 were irradiated with 100 and 14 m.a.H. The four Bengal types gave higher yields after treatment. Many previously irradiated TMV 1 and 2 plants gave better yields in the X_2 generation than in the X_1 . Comparison of the X_1 , X_2 and X_3 generations of the Bengal types 12 and 16 showed that, though the yields of the X_1 were lower than the controls, the X_2 and X_3 gave higher yields. The pollen grains of treated plants had higher sterility and were usually larger. The treated Bengal types were in general earlier in flowering and some were harvested earlier. When the X_1 and X_2 generations were compared for earliness many types maintained the character into the X_2 . It was found to vary with sowing date. Seeds of treated and control plants were analysed for oil content and sap, iodine and peroxide value. Seeds of one T 16 plant treated with 50 m.a.H. had half the peroxide value of the controls and equal yield.

1722 Scientific Reports of the Indian Agricultural Research Institute for the year ended 30th June, 1951 (1953) : Pp. 120.

Varietal trials of forage grasses, leguminous crops, including cowpea and soya bean, sweet potato, tobacco, chillies, sunflower, pea and

chickpea were carried out in addition to the following:—

Wheat. NP 710 gave the best performance under barani conditions and on sandy loams. NP 760 was superior on heavier loams. Selection for rust resistance has continued. Varieties superior to the local types in various districts are mentioned. Amphidiploid seeds of the sterile F_1 hybrid *Triticum dicoccum* x *T. monococcum* have been obtained by treatment with colchicine. Chromosome numbers varying from 42 to 56 have been found in plants of a stock of *Triticale* originally obtained from Cambridge. The diseases caused by *Puccinia graminis* var. *tritici*, *Ustilago tritici*, *Fusarium* sp. and *Corynebacterium tritici* were studied and resistance trials carried out.

Maize. In trials, Australian hybrids were superior to Canadian hybrids, Dixie 11 gave the highest yield of 36 American hybrids and Hybrid U 80 was best among the commercial types tested.

Barley. Seedling and adult resistance to *Puccinia graminis* var. *tritici* and *P. glumarum* was tested. B 216 was resistant to all 10 races of yellow rust at the seedling stage and 8 varieties were resistant at the adult stage.

Sugar cane. Tests of 94 varieties for resistance to *Colletotrichum falcatum* by the plug method showed four to be highly resistant, and 59 moderately resistant, whilst 18 were resistant to nodal infection. Light, profusely sporing isolates of the fungus were more virulent than dark, sparsely sporing ones. Less than 5% infection was obtained in 26 varieties in tests for resistance to *Ustilago scitaminea*. Breeding for resistance to these two diseases is in progress.

Sesame. Autotetraploid NP 7 was superior in growth, yield and number of good seed per fruit to NP 6. The diploid NP 7 material was found to be heterozygous. Selections resulting from hybridization between *Sesamum orientale* and *S. prostratum* showing resistance to the phyllody disease are under trial and are giving higher yields than controls. The chromosome numbers of *S. alatum* ($2n = 26$), *S. angolense* ($2n = 32$) and a related genus *Ceratotheca sesamoides* ($2n = 32$) have been determined.

Linseed. The rust-resistant strains RR 39, 204, 67, 38 and 40 were superior in yield, rust resistance and oil content to NP 12. In tests for resistance to *Melampsora lini*, 104 out of 105 types of linseed hybrids were immune or resistant.

Tomato. The hybrids 4 and 9 gave good early yields at all stations in trials of hybrids and

commercial varieties. In trials of indigenous and exotic varieties, an Australian selection of Sioux, Q1, gave a superior performance to Sioux itself; in the summer crop Nystate and Australian Earliana appeared best and in the late summer crop, Pearson, Sioux, Devlin's Choice and Desi Dickson did well.

Abelmoschus. A new wild species, *Abelmoschus tuberculatus*, related to *A. esculentus*, has a chromosome number $2n = 54$ and considerable resistance to the common virus of *A. esculentus*.

Pigeon pea. Out of eight wilt-resistant varieties and five hybrid derivatives, D 16-17-2 gave the highest yield. The varieties NP 41, C 38-1-2 and D 419-2-4 were highly resistant to *Fusarium udum*.

1723 Annual Report of the Institute of Agriculture, Anand, for the year 1949-50.

Bull. Inst. Agric. Anand (Gen.) No. 10 : Pp. 32.

Annual Report of the Institute of Agriculture, Anand, for the year 1950-51.

Bull. Inst. Agric. Anand (Gen.) No. 11 : Pp. 37.

The results of trials, carried out in 1949-50 and 1950-51 with selections of the following crops, are given: sundhia jowar, egg plant, okra, *Cyamopsis psorolioides*, cumin, chillies and fennel.

1724 Annual Report of the Research Division, Ministry of Agriculture, Sudan Government, 1950/51 (1953) : Pp. 187.

The account of cotton breeding given in this report has already been summarized in *PBA*, Vol. XXIII, Abst. 2817. Varietal trials of maize, sorghum, sunflower and groundnut were carried out.

Sesame. Local varieties have been collected to form a reservoir of genetic material. No plants with indehiscent capsules were found. Emasculation and pollination techniques were devised.

Dolichos lablab. With a view to obtaining a variety resistant to *Xanthomonas phaseoli*, techniques for producing infection were studied. In the dry season this can only be done by repeated spraying in the greenhouse. There were indications of segregation for resistance in two Indian varieties, ECR/127 and ECR/135. The flower is self pollinated and emasculation and pollination techniques have been devised.

- 1725 Rapport du Conseil de l'Expérimentation et des Recherches Agronomiques pour 1952. (**Report for 1952 of the Experimental Council for Agronomic Research**).

Alger 1953 : Pp. 256.

The report includes data on variety trials conducted at the Station Centrale de Maison-Carrée and at a number of substations throughout Algeria. In addition to the crops listed below, the results of varietal tests of cotton, tobacco, strawberry, grapes, tomato, beans, pea and lentil are given.

Wheat. Langlois 1527, Bidi 17, Bidi 26, Oued Zenati 368 and Palestine Wheat J 5 gave the highest yields among a large number of hard wheats tested. Of the soft wheats, Pusa x Florence 380, Florence x Aurore, Pusa x Mentana 9340 and Maroc 1513 [Morocco 1513] proved superior. Research on strains resistant to drought, mildew and rust is continuing and a number of lines have been selected.

Oats. Varieties of North African, French and foreign provenance were tested. Palestine 1947 and H 26-11 gave good results.

Maize. Dixie 18 gave the highest yields of grain and forage.

Barley. Strains 48 and 1542 were superior to numerous other varieties tested.

Rice. The hybrid Insen x Tremasino gave the highest yields of varieties tested under Algerian conditions.

Melilotus. In trials at the Experiment Station, Ain ben Noui, *M. alba* var. *annua* gave the highest yields of green manure.

Potato. Ker Pondy, Sirtema, Sientje and Muntinga 17 proved the most productive.

Sugar beet. Vilmorin B gave the highest yield of sugar per given area and had also the highest sugar content per given weight of root. Bataille [Battle] also gave a good yield.

Soya bean. Lincoln and Serda 213A proved productive and had a high oil and protein content.

- 1726 GOSSWEILER, J.

Nomes indígenas de plantas de Angola. (**Native names of the plants of Angola**).

Agron. angol. 1953 : No. 7 : 3-587.

From 1900 until his death in 1951 the Portuguese botanist J. Gossweiler made a study of the flora of Angola and this whole number of the journal *Agronomia Angolana* is devoted to the publication of an alphabetical list of vernacular names of the plants, with indications of their Latin

names, locality, collector and the dialect to which the name belongs, followed by descriptions, in Portuguese, of the individual species presented in systematic order based on the Bentham and Hooker classification. Many of the species are illustrated by photographs and the volume terminates with an alphabetical index to the species.

- 1727 Rapport annuel pour l'exercice 1952. (**Annual report for the financial year 1952**).

Publ. Inst. Nat. Agron. Congo Belge 1953 : Hors Sér. : Pp. 395.

This report (cf. Abst. 147) from the National Institute for Agricultural Research in the Belgian Congo includes the following information of interest to breeders:—

Maize. American and Italian varieties have been introduced and are undergoing tests at Yangambi. Selection and crossing to produce higher-yielding varieties are continuing and a number of synthetic lines have been produced. At the Mukumari Station, two varieties selected at Gandajika, Gan and GPS₁G9, have yielded 3975 and 3967 kg. per ha. respectively.

Millet. At the Gandajika Station, selection of *Pennisetum typhoides* is continuing (cf. Abst. 147).

Rice. At Yangambi, varieties introduced from abroad have been tested for yield, vigour, resistance to disease and quality of grain. The pedigree line R 20 (C11/4/9/1) has yielded 4016 kg. of winnowed dry paddy per ha. At the Obokota and Mobanga substations, R 69 and R 65 have outyielded local varieties. At the Kondo Station, E 64 Mangala and E 65 Temperikiti proved superior.

Forage grasses. On the island of Bosa, *Cynodon dactylon*, *Echinochloa pyramidalis*, *Brachiaria eminii* and *Panicum maximum* proved resistant to repeated floodings. *P. maximum* appears to be well adapted to the white sands of Lilanda.

Oil palm. At the Bunga Station, 53,460 local and 91,659 Yangambi palms have been examined as part of a programme to select mother trees. Investigations at the Yangambi Research Centre into the inheritance of the *albescens* character are continuing (cf. Abst. 147). Data on the results of trials at Yangambi and numerous other stations are given.

Urena lobata. Preliminary pollination experiments indicate that *Urena* is autogamous. At Gimbi, the strain M'Vuazi gave the highest yield of fibre per ha.

Cassava. Elimination of poor yielding clones and of clones susceptible to mosaic, rot and lodging is continuing. I 11/52 and 31 gave the highest yields, producing 45,000 kg. and 43,600 kg. of root per ha., respectively.

Coffee. At the Yangambi Research Centre, five lines are in the course of being multiplied. The average annual production of L 251, L 93 and SA 158 during the period 1947-51 has been 1028, 1158 and 909 kg. of marketable coffee per ha., respectively. L 147 continues to yield well; during 1951-52 it produced 3553 kg. per ha. L 251 appears to be highly resistant to *Fusarium*. At the Kondo Station, the clones M 14 and M 15 gave the highest yields.

Cacao. At Yangambi, F 698 gave the highest yields. Further data on the selection of criolloid mother trees at Yangambi (cf. Abst. 147) and at the Kondo Research Station are given.

Rubber. Experiments at Yangambi have shown degree of precoagulation to be genetically determined. Clone M 4 was least susceptible to precoagulation. Selection within the clone Tj 1 has given trees with a higher yield than the average. The results of seedling and clonal trials at Yangambi, Kondo and several other stations are given; at Yangambi, M 8 and Av 49 gave the highest yields.

Citrus. Data on the comparative yields of varieties of orange, lemon and mandarine at the Vuazi Research Station are given.

Mango. The varieties Cecil and Pico and the clones Cecil, Pico and Faizanson proved the most productive.

Groundnut. At Yangambi, A 4 x A 49 and Mfoko B gave the highest yields in variety trials. At the Kondo Station, the Yangambi line A 2230 gave the highest yields.

Banana. At Gimbi, Litete de Yangambi and Seluka Local gave the highest yields per ha.; Dongila and Mukamata produced the largest bunches.

Soya bean. Data on trials at Yangambi of a large number of varieties introduced from Tanganyika are presented. At the Vuazi Research Station, the lines K 92/6/2/3 and K 2/3/3/2 yielded 425 kg. per ha.

1728 **Overseas food corporation. Report and Accounts for 1952-53** : London 1953 : Pp. 94.

The following research carried out in East Africa is reported.

Maize. Katumbili gave the highest yield of 14 varieties.

Millet. Golden millet gave the highest yield and was easiest to harvest.

Sorghum. The varieties in the Experimental Farm collection most resistant to mildew and rust are the Dwarf Shallu 5772/2, 5772/3 and 5631/12 and the L series (L1, L/17, L/20, L/26, L/28 and L/31). It is confirmed that Shallu sorghums show resistance to *Calidea dregei*. AEM Fuaranga Miller, Machewe, Quick maturing Mawe, Mandani, Ameli and EM Manga were short enough for combine harvesting.

Jute. *Corchorus capsularis* was superior to *C. olitorius* but only grew well on low-lying, sandy, grey soils.

Hibiscus. *H. mastersianus* has a long enough growing season to produce maximum growth (100 days). The season at Kongwa was too short for imported varieties.

Groundnut. In trials of short-season varieties, no variety gave a significantly higher yield than Natal Common. The three highest yielding types in the trials of late, medium and early varieties are given. Varieties resistant to *Cercospora personata* were Kanyoma, Matevere and HGI. Results of five trials in the Kongwa area are given. Infestation figures suggest that the partial resistance of two strains of Mwitunde to rosette is due to their effect on the aphid vector. An attempt is being made to combine the resistance and seed dormancy factors of Mwitunde with the high yielding qualities of Natal Common.

Soya bean. Malaya, Ursoy, Mis 28 EB 3901 and Benares again showed superiority whilst Soya 29 and 27 were also promising. Mis 28 EB 3901 will probably be valuable as a fodder variety. Single line selections have been made of CNS, R184, Light Speckled and Glycine 317 Rugget. The West Coast variety Dixie appears well adapted to Nachingwea conditions and suitable for combine harvesting.

1729 **Annual Report of the Department of Agriculture, Colony and Protectorate of Kenya, Vol. II—Record of Investigations 1951 (1953)** : Pp. 170.

Pyrethrum. In the second-year variety trials, several crosses have given promising results. New crosses were effected.

At Molo a system of line breeding was initiated in which clones selected for (1) high altitude and (2) low altitude, and, within each of these categories, for high yield of flowers or high pyrethrin content, were crossed with one another in isolation plots. The crossed seed is to be used for (1) establishing plantings for the immediate production of commercial seed, by sowing mixtures, and (2) testing and selection within each cross.

Wheat. Two new races, K 11 and K 12, of *Puccinia graminis* var. *tritici* have appeared.

The beardless, white-grained variety 321 BT 1 Bl (Australian 45 C 5 x 117 A) was released, chiefly on account of the stem-rust resistance it has exhibited in the field; its yielding capacity is only moderate. It is suitable for areas with a growing season of $5\frac{1}{2}$ months and an altitude of 6000–7500 ft.

Crossing and back-crossing at the Plant Breeding Station, 7100 ft., continued. At Molo, 9300 ft., and Ol Joro Orok, 7800 ft., breeding for resistance to *Puccinia glumarum* is in progress, using Equator as the resistant parent.

Maize. Further work on the production of locally adapted hybrids was carried out at Njoro, Kitale and Rongai. Inbreeding of introductions and local maize continued; top crosses were made to test combining ability. In trials of single and double crosses at Njoro, no entry gave significantly higher yields than the mass-selected seed. In the application of Harland's intragenotypic method at Njoro, a second cycle of selection was initiated.

Other cereals. Introduction and testing of oat, barley and sorghum varieties for adaptation to the different altitudes continued.

Sunflower. Mass and single plant selection of Klein, Southern Cross, Mennonite and Sunrise is in progress.

1730 Weidingnavorsing in Suid-Afrika/
Pasture research in South Africa.
Vorderingsversl. III, Deeie I–III/
Progr. Rep. III, Pts. I–III. Dep. Landb.
Suid-Afrika 1951–2 : Pp. 19 + 16 +
19 + 49; 39 + 51 + 82 + 10 + 14;
109 + 66 + 19 + 10 + 47. (Mimeographed).

Data on variety trials and breeding in South Africa of forage grasses, forage trees and clover are presented. At the Potchefstroom College of Agriculture, Transvaal, lines of *Setaria* and *Pennisetum* have been selected for increased seed yield. Attempts, hitherto unsuccessful, to cross *S. sphacelata* with *S. italica* are to be continued. Of the three main ecotypes of *S. sphacelata*, Kazungula proved the most vigorous and gave the highest yields of forage. Selection in this type is to be concentrated on developing a line which is highly fertile when open pollinated. Open-crowned, semiprostrate types proved more resistant to drought than tall, erect plants. *P. purpureum* was crossed with *P. typhoides* in an attempt to combine the desirable characters of the former with the good seeding habits of the latter. The F_1 was highly productive, but largely sterile. It is hoped, however, to obtain

F_2 segregates with good seed sets. Attempts are being made to induce fertility by means of colchicine treatment. Selection for resistance to cold is being carried out in *P. purpureum*. Chromosome counts of *S. sphacelata* have shown $2n = 56, 63, 66, 67, 70$ and 86, thus indicating secondary polyploidy.

At the Vaal-Hartz—Agricultural Research Station, Cape Province, the clover varieties New Zealand Montgomery Red, Giant Colonel Red and New Zealand grown red clover gave the best results.

1731 NEVELING, C. H.

Report of the Secretary for Agriculture for the year ending 31 August, 1953.

Fmg. in S. Afr. 1954 : 29 : No. 334 : 3–124.

Wheat. The new wheat Dromedaris has been issued for the winter-rainfall region. *Triticum-Agropyron* back-crosses are being subjected to rigorous selection for agronomic characters and disease resistance. *T. timopheevi* derivatives, Frondosa and Fronteira are also being used in breeding for disease resistance.

Oats and rye. More satisfactory sources of resistance to disease, particularly *Helminthosporium* leaf spot, are to be used in breeding oats for the highveld area. In breeding rust-resistant rye, selection is to be based on noninbred plants showing resistance at the seedling stage.

Maize. Progress in the hybrid seed scheme of the Mealie Board is reported.

In the highveld region, the top cross Potchefstroom Pearl x K 64 outyielded ordinary varieties by an average of 47% in commercial sowings during the dry season of 1951–52. Even the F_2 gives higher yields than the commonly cultivated varieties. Double hybrids have now been produced and their seed increase is planned. A yellow flint double hybrid developed at the Bethlehem Station is expected to replace the variety Boesman Cincinnati.

In the Natal region, top crosses and single hybrids were subjected to yield trials.

Except for lines with very long internodes, inbreds studied by the Division of Plant Pathology transmitted the character of resistance to stalk rot (*Fusarium moniliforme* var. *subglutinans*) to single crosses. Reciprocal recurrent selection is being applied to Potchefstroom Pearl and P x H (= Peruvian x Hickory King).

Sorghum. Some locally developed and introduced varieties of kaffir corn outyielded commercial varieties when tested in the highveld

region. Selection for resistance to *Gloeocercospora sorghi* was effected.

Pasture grasses. Selection of many local and introduced species is in progress. Breeding work on *Digitaria smutsii* and *Setaria sphacelata* has been initiated.

Forage legumes. In tests in the winter-rain-fall region, two new strains of sweet lupin, one blue and the other yellow, almost equalled bitter lupins in seed yield.

In breeding lucerne for the Karoo and Eastern Cape regions, polycross tests are being carried out.

An erect strain of cowpea for hay has been selected for the highveld region. An early-maturing erect strain with good seed yield has also been developed; it is suitable for combine harvesting since it bears its pods high and ripens uniformly. At the College of Agriculture Natal, colchicine-induced polyploids of cowpea exhibited gigas characters but a slow initial rate of growth.

A soya bean variety for hay production and combine harvesting is to be multiplied for release in the highveld area.

An early-maturing white field bean, highly resistant to disease, has also been developed for this region.

Root crops. Mangel and sugar-beet breeding is receiving attention at the Grootfontein College of Agriculture.

Potato lines combining some degree of resistance to leaf roll with good agronomic characters have been bred by the Division of Plant Pathology; Shamrock, South Esk and unnamed varieties from Basutoland and South America constituted the original sources of resistance. About half of the lines are field-immune from virus X; many are also expected to be resistant to virus A. Lines with varying numbers of genes for resistance to late blight are under trial.

Cotton. Breeding at Barberton is mainly concerned with strains of Muka (MV 8 x BP 52). In breeding for bacterial-blight resistance, local strains were crossed with the resistant Stoneville 20.

Tobacco. The F_1 hybrid Yellow Mammoth x Vamorr was particularly promising; its smoking characteristics have still to be determined.

In breeding for mosaic resistance, varieties carrying the factors *NN* and *aa* are being used. Breeding for mildew resistance continued successfully; interspecific crossing was effected, as well as back-crossing of *Nicotiana glutinosa* x *N. tabacum*.

The percentage of natural crossing was again

found to be very low (0.1-0.2%), even when the parents were only 3 ft. apart.

Chicory. Breeding is in progress at the Grootfontein College of Agriculture.

Fruits. The peach Swellengrebel, developed by the Western Province Fruit Research Station, is a white-fleshed freestone type ripening shortly after Early Dawn; its keeping quality is especially good. Breeding for earliness has been the main objective of new crosses of canning peaches.

Grape, apple, apricot and plum breeding is also being carried out. The plums Sugar and President have been crossed to breed a prune type resistant to delayed defoliation.

Vegetables. At the Horticultural Research Station near Pretoria, selections of Early Cape Flat onions, with early maturity and a low percentage of bolters, have been developed. New dwarf and runner bean strains and varieties have been released for seed multiplication. One of the dwarf beans, H 34/9, has shown good yielding capacity, bacterial-wilt resistance and suitability for canning.

The possibility of producing F_1 hybrid seed of tomato for the lowveld zone is being investigated. Seed is being produced not only by hand emasculation and pollination but also by using male-sterile mother plants.

1732 Amélioration des plantes. (Plant breeding).

Rech. agron. Madagascar 1952 : No. 1 : 40-81.

The following crop plants are treated in this report on agricultural research in Madagascar:—

Rice. Trials of varieties from Alaotra and from Marovoay are recorded in tables showing the yields and the grain and plant characters.

Selection aims must include high yield, resistance to lodging, and a grain quality that will meet the various requirements of the consumers and of the manufacturer, whose products may call for special characteristics of the grain, e.g. low husk percentage and resistance to breakage in milling.

The genetic origin and main characteristics of four selections distributed by the Alaotra Station are indicated and seven types of rice are specified as of value in breeding for non-lodging dwarf habit, productivity and slender, hard or translucent kernels, or grain resistant to shedding but not too difficult to detach from the pedicel.

Breeding material of hybrid origin includes line 308, which ripens 15 days after Makalioka 34 and should therefore be of considerable

interest in prolonging the harvest season, where the crop is being grown on an industrial scale.

Cotton. A general account of the cotton plant, its different species and its biology and the diseases to which it is subject is followed by some brief observations on the growing of local and foreign cottons in experiments at the Marovoay and Alaotra Stations. At the latter station, local varieties seem to be hardy and resistant to parasites, but deficient in quality. Cotton cultivation and breeding in the Belgian Congo are also described (cf. Abst. 930).

Kapok. A general review is given of the various consignments of kapok that reached Madagascar from different sources and have been undergoing selection and multiplication by grafting from time to time since 1934.

Taxonomically, the kapok tree in Madagascar comprises *Ceiba pentandra* and hybrids of *C. guineensis* with *C. thonninguii*, and the cultivated varieties may be innumerable. Some data from the Marovoay Station on the productivity from 1933 to 1945 of six varieties whose origin is more or less known are tabulated. Togo 12, Togo 13, Bondowoso and Toga 24 are regarded as the best for distribution until tests of other clones are completed.

Cassava. The Alaotra Station is concerned with ensuring the provision of varieties and clones adapted to the various ecological regions of Madagascar. Fifteen varieties that are being distributed by the station are listed, with notes on their origin, botanical features, disease resistance, probable yielding capacity, starch content, taste, suitability for consumption and adaptation to particular soils and altitudes. Distinctive botanical characters of the best varieties of cassava are also set out.

Vanilla. The clones in the collection established at the Ivoloïna Station are being described and identified, and species from South America, the centre of origin of the genus, are also being obtained.

The collection of the Alaotra Station consists of Malagasy species and *V. planifolia* ($2n = 32$), whose classification is being completed by cytological examination. Studies of germination, the development of a natural seedling of *V. madagascariensis* and resistance to *Fusarium* are in progress.

Interspecific crosses have been attempted between *V. planifolia* and any clones regarded as promising, but the germination capacity of the few seeds of the hybrid obtained, *V. planifolia* x *V. coursii*, was poor.

Fig. Wild figs with edible fruits and the introduction of the domesticated fig into

Madagascar are briefly discussed, with notes on the varieties of caprifigs and the diecious and monocious forms of caprifigs introduced from Morocco and Algeria. It is not yet known whether the *Ficus* forms of Madagascar have their own insect vectors of pollen or whether insects for their pollination will need to be imported.

Groundnut. A collection of varieties from various parts of the world is being built up at the agronomic stations at Alaotra and Marovoay; it includes six spontaneous hybrids; Valencia x Espagnole [Spanish] and Buitenzorg x Espagnole both appeared in 1937.

In comparative trials at Alaotra, H 33, a spontaneous hybrid of Espagnole x Bunch, is the most promising oil variety; it is erect in habit, with fruits borne in a cluster, two features which facilitate cultivation and harvesting on clay soil.

Research is in progress to develop (1) a type suitable for confectionery and (2) varieties with a higher yield of oil per ha. for industrial use.

1733 KNIGHTS, J. K.

Progress Report of the District Experiment Substation, Fort William, Ontario, and Associated Illustration Stations in the Kenora and Rainy River Districts, 1948-1952 : Pp. 47.

The results of variety trials of the following crops over a four-year period are given and discussed: winter and spring wheat, oats, rye, fodder maize, barley, oats and barley as mixed and single crops, grasses, legumes, linseed, root crops, potato, field peas and soya beans.

1734 **Annual Report of the Director, Experimental Farms Service, Department of Agriculture, Ottawa, Canada, for 1952-1953 : Pp. 44.**

A report of the most important results obtained by research at Canadian experimental stations in the following crops and already reported in Abst. 152 is given: wheat, oats, barley, tobacco, linseed, apple, pear and tomato. Fort, a new barley variety for forage, which shows resistance to lodging, has been produced. It is not recommended for areas farther west than eastern Ontario.

1735 **Seventy-Seventh Annual Report of the Ontario Agricultural College and Experimental Farm 1952 (1953) : Pp. 117.**

Breeding and trials of oats, barley, maize, brome, cocksfoot, birdsfoot trefoil and Alsike clover were carried out as well as the following:—

Wheat. Breeding for resistance to leaf rust, stem rust, loose smut, and bunt, for strength of straw and for high yield and good quality grain is taking place.

Oats. A new variety Simcoe, derived from Ajax x Erban, was licensed. It is high yielding in many parts of Ontario.

Lucerne. Breeding for resistance to bacterial wilt has been undertaken.

Potato. Varietal trials and selection for resistance to scab and blight were carried out.

Cucumber. Hycrop Pickling Hybrid has been produced. It is comparatively cold resistant, highly resistant to mosaic and heavy yielding.

Soya bean. It was shown that hybridization and growth can take place successfully in growth chambers by the use of artificial light during the winter months. A new electronic oil-testing machine is being used to determine the oil content of the small amount of seed available from early generation breeding strains. Later-maturing varieties have an advantage over earlier-maturing varieties when the two types are grown in alternate rows.

1736 McKIBBIN, R. R. (Editor)

The changing pattern of agronomy and horticulture in Canada.

Advanc. Agron. 1953 : 5 : 319-81.

Section I of this joint review consists of an introduction by R. R. McKibbin. Section II is contributed by C. H. Goulden and is devoted to cereals. In the fourth part, T. M. Stevenson deals with forage crops; the fifth section, by M. B. Davis, is concerned with horticulture. In the sixth and final part, N. A. Macrae discusses the subject of tobacco. All these sections include references to the role of improved varieties and to breeding programmes. A survey of progress in field husbandry, soils and agricultural engineering is contributed by P. O. Ripley in section III.

1737 **Annual Report of the St. Kitts-Nevis-Anguilla Agricultural Department, for the year 1952 (1953) :** Pp. 32.

Cotton. MSI gave significantly higher yields than BD and the two VH8 strains V5 and V6. There were significant differences between the six VH8 strains. V5 and V6 are being discarded.

Sugar cane. The B41', B43', B44', B45' and B47' series have been compared with B37161. B41211 gave higher yields than B37161 in practically all the trials. B4362 gave high quality juice but a comparatively low yield. Others were selected as worthy of further trial. A summary of planting recommendations is given.

1738 **66th Annual Report of the Mississippi Agricultural Experiment Station, for the fiscal year ending June 30, 1953 :** Pp. 110.

In addition to the following research, breeding of peach, strawberry, raspberry, tomato, potato and tung continued, and trials of apple, pear, lettuce, pea and sweet corn were held.

Wheat. Breeding for improved plant height and reaction to leaf rust, mildew, stem rust and loose smut is being carried out.

Oats. Strains resistant to leaf rust and Victoria blight with high forage production have given good yields and resist lodging. Delta, Red 88, Madison County and Nortex 107 are blight and rust resistant. A new variety Delair was released (cf. *PBA*, Vol. XXIII, Abst. 2616).

Rye. Breeding for yield and rust and anthracnose resistance is being undertaken.

Maize. A new double cross hybrid Miss. 1123 can be produced without detasseling by using a male-sterile inbred as the seed parent. An inbred line which remains succulent for two weeks longer than usual has been developed. Yellow and white inbred progenies have been found resistant to drought and heat. Two inbreds have been found which can restore fertility to male-sterile white and yellow lines.

Barley. Earliness, resistance to stalk and root lodging, disease resistance and smoothness of awns are being emphasized in the breeding programme.

Sorghum. Self-fertile segregates of Johnson grass x sorghum were obtained. When hybridized with sorghum Mn 1054 they manifested hybrid vigour by extreme height and lateness. Tracy had a higher syrup yield than other varieties during the five years in which it had been tested. It is an early variety with good silage production.

White clover. Of 10 varieties and strains tested at four stations, Louisiana Synthetic 1 gave the best yield in each case.

Sweet potato. Allgold and Goldrush sprouted satisfactorily, Allgold being slower to begin. Allgold gave the highest yield.

Cotton. Breeding for resistance to *Verticillium* and *Fusarium* wilt is taking place. Properties found among the species growing at the Delta Branch Station included immunity to *Fusarium* wilt, resistance to root knot nematode and tolerance of herbicidal oils, whilst characters selected included early blooming, quick boll maturity, wide bract flare and very strong lint. Doubled haploids are being used as recurrent parents in transferring desirable characteristics. The inheritance of lint index was studied.

Significant varietal differences were found in fruiting and boll drop as well as in response to herbicidal oils. Breeding strains more suitable for mechanization continued and selections for yield and smoothness of leaf were made.

Sugar cane. CP 36/111, a purple variety, and CP 24/116, a green variety, are both resistant to mosaic and give good yields. The former is straighter and easier to strip.

Red pepper. Selections with high resistance to virus have been obtained.

Cantaloupe. Strains produced by crossing local and foreign varieties and which combine resistance to downy and powdery mildews and some insects are being tested.

Water melon. Work to obtain varieties resistant to *Fusarium* wilt and anthracnose is in progress.

Cucumber. Breeding to develop a better pickling variety has continued. New crosses between Magnolia or Model and two Puerto Rico lines have been made.

Tomato. A line with type A resistance to wilt has been released as a commercial variety.

Bean. Work is being done to develop an improved variety of bush snap bean. Contender and Topcrop gave the best yields in trials.

Lima bean. Clark's Bush and Early Thoro-green gave the highest yields and also contained more carotene, calcium, phosphorus and protein than other varieties.

Cowpea. A third race of *Fusarium* wilt has been found widely distributed in Mississippi. Resistance to it has been found in some field-type varieties. Development of a Brown Sugar Crowder strain resistant to all races continues.

Soya bean. N 47-3479 has been released as the variety Jackson (cf. Abst. 749); Dorman has also been released during the year (cf. *PBA*, Vol. XXIII, Abst. 778).

1739 Sixty-fourth Annual Report of the University of Tennessee Agricultural Experiment Station, 1951 (1952) : Pp. 132.

Wheat. Fourteen lines of wheat were observed for resistance to leaf rust, stem rust and mildew. Variety tests were carried out.

Oats. Forkedeer and LeConte yielded more than Fulgrain and Stanton. LeConte matures later but has stiffer straw. Selections were made for resistance to disease, the most promising being from Santa Fe x Fulwin x LeConte and Santa Fe x Clinton x LeConte.

Barley. In variety tests, Jackson 1 continued to give the highest yield. Upright 11-172 showed winter hardiness, high yield, and though

later in maturity, it had stiffer straw than Jackson 1. It is a selection from a three-way cross involving Wong, Kentucky 1 and Jackson 1. Resistance to scald is being obtained from hooded varieties. Most selections now under trial have mildew resistance.

Forage grasses. The emphasis of the breeding work is on Kentucky bluegrass, orchard grass and tall fescue. Tall fescue 8-53 and its isolates continue to be as good as Alta and Kentucky 31 fescues.

Sweet potato. The best yields at Jackson out of fifteen varieties were from N-38-48B, followed by La-240, which was third at Knoxville. Out of eight varieties tested at Knoxville, B-5999 from Louisiana yielded best.

Cotton. In trials of 16 varieties at four locations, Tennessee 19 and 818 yielded most lint. Tennessee 818 resulted from crossing inbred lines from Coker 100-6 and Empire. It gives a good yield of seed cotton, has a medium-sized boll and is early maturing. Tennessee 19 was obtained by hybridizing Stoneville 95-9-1-1 and 68-3-4-5. It is early, vigorous and prolific, the bolls are round, blunt and easy to pick, but they are not so large as Tennessee 818 bolls and the staple is not so long. In general, bulked progenies maintain a higher vigour and yield than unbulkied progenies from crosses of inbred lines. Breeding for resistance to *Verticillium* wilt is in progress.

Tobacco. Breeding for resistance to black shank, mosaic and wildfire is being carried out. Variety tests were conducted with Burley Type 31 tobacco. In a comparative test of Burley 1 and Kentucky 16 under various conditions, the former gave tobacco of the better quality, while the latter yielded more heavily.

Apple. Jonathan, Early McIntosh and Summer Rambo grew most vigorously of a series of varieties under trial.

Pear. Seventy-five varieties are being tested for resistance to fire blight. In one orchard 82% showed no sign of the disease.

Peach. All varieties at Springfield showed cambial injury due to low temperatures, except possibly Golden Jubilee and Burbank Elberta. Georgia Belle, Hardin's Pride and Shippers Late Red were excessively susceptible.

Strawberry. In variety tests, Blakemore, Tennessee Beauty and Tennessean produced more runners than Armore and Vermillion in unfavourable summer conditions. Forty-nine selections were compared with Tennessean, Blakemore and Fairmore for yield. Tennessee Beauty and Tennessean yielded most. T-1104 and T-1112 produced early fruit.

Grape. In trials at Knoxville, the best of the new varieties appeared to be Seneca, Athens, Van Buren, Kendaia, Ruby, Urbana and Sheridan. Van Buren and Sheridan appeared among the best at Crossville.

Cauliflower. Snowball E was the highest yielding variety at Crossville and Snowball X outyielded Snowball 34 at Knoxville.

Broccoli. In the spring DeCicco and Early Green sprouting broccoli were the best varieties.

Lettuce. Out of four varieties, Great Lakes and Progress were best. Premier and Pennlake were severely affected by tipburn.

Pea. In pea variety tests at Knoxville, Wando yielded best and was a good freezing type.

Tomato. Urbana, STEP 190 and Stokedale were first, second and third respectively for yield at Jackson. STEP 190 is about 10 days earlier than Rutgers and seems to be as tolerant of *Fusarium* wilt. It is used chiefly for green-wrap. At Knoxville, STEP 89, STEP 139 and two selections of Rutgers, 2 and 3, were best out of ten varieties. STEP 140 yielded most fruit between 20 and 25 June, STEP 89 was second and Urbana third. Under Tennessee conditions 2-8% of field crossing was observed between Green Stem 5 and normal tomatoes. In disease resistance tests, Missouri 160-A was highly resistant to buckeye rot, wilt and late blight on the foliage, but very susceptible to inoculations of late blight into the fruit.

Sweet corn. At Knoxville, out of 13 varieties, Huron yielded most, followed by Calumet. Huron, Oto, Ioana, Golden Security and Golden Hybrid 1734 were rated best in quality.

Beans. Contender and Topcrop gave high yields in trials at Crossville and Knoxville. The pole bean varieties Green Savage and Canfreezer yielded better than Kentucky Wonder at Knoxville. In Lima bean trials, Emerald yielded best at Knoxville, and Oklahoma 13-1 at Jackson.

1740 **Sixty-fifth Annual Report of the Tennessee Agricultural Experiment Station, 1952 (1953) : Pp. 58.**

Oats. Forkedear was the only variety to survive severe winter frost at Crossville and Columbia. Selections showing resistance to leaf rust and crown rust are being tested further.

Barley. Upright 11-172 yielded more than Jackson 1 at six locations. A number of stiff-strawed selections were considered superior to Jackson 1 in the new strains test. Resistance to *Helminthosporium sativum* has been found in some selections and others are showing

resistance to *Ustilago nuda*. Lines resistant to scald are being used to develop resistant locally-adapted varieties.

Cotton. The variety Fox was recommended for distribution in Tennessee. Tennessee 818, when tested at Sikeston, Mo., ranked first among 25 other varieties.

Tobacco. Some lines are showing resistance to black shank. Mosaic and wildfire resistant lines are ready for appraisal by growers. Out of 15 lines of mosaic-resistant Type 22 tobacco, 7 were comparable in yield and quality to Madole. Several new lines of Burley Type 31 were superior to Burley 1. The burley breeding line Greenville 24 has been released as Burley 2. It resembles Kentucky 16 but has a higher average yield. It is heavier-bodied than Burley 1 and is intended to supplement it. Greenville 25 is promising and combines resistance to wildfire, mosaic and black root rot.

Peach. The best varieties were Redhaven, Dixigem and Triogem, which are earlier than Elberta. Resistance to, and recovery from, winter injury are being studied.

Bean. Lines of beans apparently adapted to East Tennessee conditions have shown considerable resistance to anthracnose.

Soya bean. An early to midseason variety, Dorman (cf. *PBA*, Vol. XXIII, Abst. 778), has been released.

1741 **Results of research in 1952. 65th Annual Report of the Director of the Kentucky Agricultural Experiment Station 1952 : Pp. 89.**

Wheat. Ky 4097-37 and Ky 4097-35 were the latest maturing varieties and were among the highest yielders.

Kentucky bluegrass. In tests of 15 varieties, 922-928 yielded most. 922-915 remained green through the summer.

Timothy. G3-41 yielded most in trials of 5 varieties. It made earlier spring growth and matured a week earlier than Marietta.

Brome. Of 9 varieties, FC 23955 gave the highest yield. Southern varieties made earlier spring growth, whilst northern varieties recovered more rapidly after the hay harvest in June.

Fescue. Preferential grazing tests showed significant differences in the amount of grazing between strains of both inbred and open-pollinated lines. In the variety tests 91-43 was grazed most closely.

Legumes. Narragansett was the highest yielding lucerne variety.

Of the red clover varieties, Kenland and Ky 215 yielded most; in the winter annual legume test of crimson clovers Kentucky Agricultural Experiment Station Selection yielded most.

Tobacco. Lines of burley and dark tobaccos have been isolated which are homozygous for genes for resistance to wildfire derived from *Nicotiana longiflora*. They are also resistant to black root rot, mosaic and *Fusarium* wilt.

The black-shank fungus produced denser colonies on media containing leaf extract from susceptible plants than from immune plants.

Pear. Of 28 varieties and selections, all were infected with blossom blight in 1952, though Orient, Waite, Tyson and Maxine showed most resistance to its spread in the wood.

Strawberry. Progeny of crosses and selfings involving Blakemore, Sparkle and Premier showed very little powdery mildew. Tennessee Skipper and Midland also transmitted resistance to the disease.

In tests of plants which had been freshly dug and plants which had been dug earlier and held in cold storage, Tennessee Skipper yielded better in the first case and Blakemore in the second.

In everbearing strawberry tests Twentieth Century ranked first in yield and Gem second.

Grape. The varieties Golden Muscat, Steuben, Sheridan and Buffalo were least affected by the cold weather.

Vegetables. Cherry Belle radish, Salad Bowl Leaf lettuce, O-S Hybrid cabbage, Iroquois musk melon, Valentine rhubarb, Market Slicing cucumber and Butternut squash are described as promising commercial varieties for Kentucky.

Tomato. In trials of varieties of known merit, 49-20 gave the highest yield but 49-48 (Early Giant hybrid) ranked first considering earliness and size. Early Prolific hybrid ranked second.

Bean. The snap bean varieties B 2869 and Top Crop gave the largest yields.

Sweet corn. In one trial Golden Grain Sherman ranked top as to yield, size of ear and earliness. In another trial Parade and Calumet were top.

1742 Thirty-seventh Biennial Report of the Kansas State Board of Agriculture, 1950 (1952) : Pp. 552.

Oats. The varieties Nemaha and Cherokee are derived from Bond and are resistant to Victoria blight. They yield better than other eastern Kansas varieties and have stronger straw and greater resistance to rust than Fulton and Kanota, which are also resistant to Victoria blight.

1743 Agricultural progress through research. Annual Report of the North Dakota Agricultural Experiment Station, 1952-1953 (1954) : Bull. No. 387 : Pp. 28.

Wheat. Ns 3880, from a cross between Lee and Mida, and Ld 356, from a cross between Ld 308 and Nugget, showed tolerance of race 15 B of stem rust. Selkirk performed well but suffered from stem rust. Crosses of Selkirk are being made with 15 B-resistant durum and bread wheats to secure more resistant material.

Barley. B 103 and B 104 from a cross between Kindred x Titan yield well and are resistant to stem rust, B 103 yielding as much as Tregal. Work on improving kernel plumpness of B 103 and on finding resistance to spot blotch is taking place.

Potato. In trials Red Pontiac gave the highest yield. Two new varieties, Manota (cf. *PBA*, Vol. XXIII, Abst. 2029) and Early Gem, yielded the same as Cobbler, which was fifth in the trials. Early Gem is a scab-resistant russet which matures about the same time as Cobbler and gives more uniform tubers on sandy soil. It has shown considerable resistance to purple top wilt.

1744 64th Annual Report of the Colorado Agricultural Experiment Station, 1950-51 : Pp. 28.

Maize. Two new hybrids, Colorado 120 and Colorado 330, have been released. In tests at Akron, Colorado 152 and Dekalb 65 have yielded well over a 4-year period, and at Hantun, Wilson W 275 has done the same.

Sorghum. Selections from a Coes x Norkan cross show promise as grain sorghum types suitable for combine harvesting. Third-generation selections from a cross (Extra Early Pink x Early Kalo) x Midland also showed promise.

Lucerne. Selection for wilt resistance in third generation Meeker Baltic and Hardistan lines increased resistance from 15% to 52% and 30% to 59% respectively in the fourth generation.

Onions. Some Sweet Spanish crosses were superior in storage quality to commercial controls. Three Globe-type hybrids were superior in yield and equal in storage quality to Mountain Danvers. Resistance to field and storage diseases has been found in five Sweet Spanish inbreds.

1745 62nd Annual Report of the New Mexico Agricultural Experiment Station, 1950-51 : Pp. 52.

Wheat. Cheyenne, Apache and Chiefkan yielded best among 10 winter wheat varieties.

Maize. The hybrid Funk's 980 produced the highest yield of 17 varieties in the Middle Rio Grande area, being followed by DeKalb 847, DeKalb 875 and DeKalb 817A.

Sorghum. Early Hegari, Midland and DD Yellow Sooner gave the highest yields of 9 combine type varieties. Of 7 bundle-feed varieties, Sedan kafir gave the highest yield, and of the 6 sweet sorghum varieties Early Sumac, Leoti Red and Sumac 108 were best. At the Northeastern Substation the grain sorghums Bonita Combine Kafir, Dwarf Hegari, Combine 7078 and Early Hegari produced 1000 pounds or more per acre. Late forage sorghums produced more than the early types.

Broom corn. Scarborough is apparently the variety best adapted to the Tucumari area.

Lucerne. Yields 10% or more above those of New Mexico Common have been produced by six new lines. Good varieties from other areas have been outyielded under New Mexican conditions by local varieties. A new variety combining tolerance of bacterial and *Fusarium* wilt and the green pea aphid is in prospect. Atlantic and Ranger had the best stands during the fourth year of growth at the Middle Rio Grande Substation.

Cotton. A new strain 1517C has been released. It matures earlier and has a greater boll weight and classer length than Deltapine 15. Selection for tolerance to *Verticillium* wilt is taking place. Preliminary work indicates that chlorophyll deficiencies in seedlings are due to 6-12 genes. Some strains appear also to have 10-12 lethal genes which prevent germination.

Chilli. Strains with thick-fleshed pods are milder than strains with thin-walled pods and long, slender pods are milder than short, wide-shaped pods. Crossing Pasilla with College 9 showed that the wrinkled-pod characteristic is a simple recessive. Wrinkled pods among the second-generation hybrids lost 15% more weight in drying than smooth pods.

Oil seeds. *Martynia parviflora*, *Cucurbita foetidissima*, *C. palmata* and *C. digitata* hold promise as oil seed crops.

Plum. The early variety Harrison Shelby produced fruit which was large and attractive, but unequal in size and quality. Of the mid-season varieties, Gold produced good quality fruit of medium size and Late Goose was late in blooming and productive but the fruit was small and of low quality.

Peach. Summercrest produced attractive, high-quality fruit which ripens about the same time as Elberta.

Pecan. Western and southwestern varieties have been crossed to develop a pecan adapted to local conditions.

Grape. Nematode-resistant rootstocks are being tested.

Bean. The new pinto bean strain 2574 gives a high yield and the beans are easy to cook and have good marketing characteristics. Tests for strains producing high yields combined with earliness and bunch-type growth are being conducted.

The aminoacid content of dried beans differs with variety.

1746 **63rd Annual Report of the New Mexico Agricultural Experiment Station for the fiscal year ended June 30, 1952 : Pp. 60.**

Wheat. In trials of 11 winter varieties at the Plains Substation, Blackhull yielded most. From 1950 to 1952, Cheyenne, Westar and Apache have produced the highest average yields. At the Middle Rio Grande Substation, Apache and Westar gave the highest yield of 7 hard winter wheat varieties. Tenmark and Triumph had high potential forage production.

Sorghum. Midland and Early Hegari were the highest yielding combine varieties, Weskan the highest yielding kafir variety and Black Spanish the highest yielding broom corn variety. In grain sorghum tests, Red Combine, Redbine 56 and Early Hegari 1547-1 significantly outyielded Martin milo.

Lucerne. Out of 32 strains, 27 produced higher yields than New Mexico Common in a one year trial.

At the Middle Rio Grande Substation in 5-year old test plots the wilt-resistant variety Ranger outyielded all others. In 1951 tests Atlantic, Pilca Butta and NM 6-1 outyielded New Mexico Common.

Cotton. In preliminary strain tests, 8893, 8879 and 8615 outyielded 1517 C. In spinning tests, two strains were superior to 1517 C. Breeding for seedling vigour, wilt tolerance and blight resistance is progressing.

Sugar beet. In tests for curly top resistance, SL 92 gave the highest yield.

Chilli. A hybrid strain 11 x M gave a higher yield than College 6.

Stone fruits. Gakaf, Golden Globe and Hale Harrison Brilliant peaches are mentioned for their good qualities.

Fuzzless Berta is the best of the nectarine varieties tested.

Elephant Heart plum has large, late-ripening fruit of firm texture.

Onion. An improved strain of White Grano is being developed which has a reduced tendency to produce seed stalks and does not produce yellow and pink bulbs.

Bean. An improved strain of pinto bean, NM 2574, has been released. It combines easy cooking qualities, high yield, and good marketing characteristics. It grows well on dry and irrigated land.

1747 Reunión de coordinación e información técnica sobre problemas agrícolas en Tandil. (**Meeting at Tandil on co-ordination and technical information on agricultural problems**). Bol. Prod. Fom. agríc., B. Aires 1952 : 4 : No. 39 : 2-23.

Wheat. The varieties that give the best results in the different wheat-growing zones of Argentina are mentioned; yield, stem-rust resistance and baking quality are taken into account in assessing their merits.

Forage plants. The speaker mentioned, among other things, the main species of forage plants suitable for cultivation in Argentina.

Linseed. Special reference is made to the varieties Charrúa MA and Querandí MA, resistant to *Fusarium*.

1748 Estación Agrícola Experimental de Palmira. Memoria 1952. (**Palmira Agricultural Experiment Station. Report for 1952**): Pp. 113.

Maize. After making observations on 357 local varieties the five best were selected for further study. A number of inbred lines were subjected to selection and tested in top crosses, and several double-cross hybrids are being produced for demonstration purposes.

Rice. A number of hybrids, some produced at the station, others introduced, were subjected to selection for vigour, freedom from disease, size and form of panicle and grain, standing capacity and time of maturity, excessively late forms being eliminated. A number of varieties are being examined from the same points of view and several of the most popular varieties are being purified by selection.

Sugar cane. A number of crosses have been made with the varieties POJ 2878, Co. 419, B 37161, EPC 37(24), MC 103/37 and Mayagüez 7. Seedlings from crosses made in previous years, using the varieties Burma, Pasoeroean and Tabango of *Saccharum spontaneum* and various noble and nobilized canes, were subjected

to selection, and chemical analyses were made of a number of promising canes.

A healthy sport appeared in a mosaic-infected plot of the variety Santa Cruz 12 (4), and four striped mutations were observed in POJ 2714, one of them being characterized by its vigour of growth.

Seedlings have been obtained from crosses of *Saccharum spontaneum* 'Mandalay' with Otaheite.

Cacao. Individual trees were selected on the basis of yield over a two-year period.

Studies on the causes of incompatibility (cf. Abst. 544) show that the substance causing self incompatibility can be destroyed by H_2O_2 or $KMnO_4$, and setting of fruit has been induced in incompatible varieties by treating the flowers with these compounds.

The pistils of self-incompatible flowers had a greater catalase activity than those of self-compatible flowers; in the latter the catalase activity rises sharply after fertilization.

Studies have been made of the effect of various fungicides and insecticides on pollen germination and fertilization.

Some crosses have been effected between Criollo and Amazónico cacaos and genetical investigations with other material have been initiated.

1749 **Annual Report of the Department of Agriculture and Stock, Queensland, for the year 1952-53** (1953) : Pp. 118.

Wheat. Spica, Gabo, Febweb, Charter, K_2P_4 -4620, Lawrence, the hybrid selection K_2 Wpt-4604 and some unnamed hybrid selections all performed well. Lawrence gave satisfactory hay yields at Kairi and its resistance to rusts makes it suitable for early sowing.

Oats. The hybrid selection BUH-4709 is to be distributed as a new variety. It is resistant to crown rust and Victoria blight. Vicland again showed its suitability for hay production at Ayr.

Maize. Tests indicate that South Burnett hybrids such as Q 23, Q 431 and Q 692 give good yields further north. In trials at Ayr the hybrid Q 440 yielded most.

Sorghum. The Queensland grain varieties Alpha and Capricorn have yielded well and Coastland showed greater freedom from caterpillar attack than the standard varieties. The results of trials at Wrotham Park of fodder and grain sorghums are given. Martin, Early Kalo and Plainsman yielded best at Hermitage.

Rice. Prelude has again shown its suitability for the tropical areas.

Forage grasses. C 948 strain of Kenya 2 Rhodes grass performed well in trials at Bilaela.

The new strain "type D" of buffel grass continued to show promise.

Sudan grass. A low prussic acid-containing selection of Roma Sudan, RS 3, is being increased for general release. A local selection of Sweet Sudan, SS 6, also has a low prussic acid content, whilst showing good recovery after cutting, and being juicy and sweet.

White clover. Selections from old stands in south-eastern Queensland show variability in yields and some strains take 30 days longer to flower than others.

Potatoes. In trials between cold-stored and barn-stored seed from Lockyer valley, Exton was the best variety in both cases. However, Sebago from Victoria and Bismark from Tasmania were superior to all other varieties from whatever source. Trials at Ayr showed that all varieties yielded better from whole rather than cut seed, Sebago and Bismark being the best. Exton and Sebago were most impressive at Gatton Irrigation Research Station.

Cotton. Coker 100 was the best irrigation cotton at Burdekin. Empire was second at Burdekin and first at Theodore. Improved fibre quality of jassid-resistant Miller strains has been recorded.

Sugar cane. Throughout the Caboolture trial the varieties Co. 301, CP29/116 and A 130 have proved best. In tests of seedlings, China and Kairi 1 were very susceptible to frost in late May. M 736 showed most frost resistance.

Tobacco. Results of trials at Clare, in which Virginia Gold and Broadleaf were the best varieties, and at Mareeba are given.

Linseed. Selections from Uruguay, Calar, Viking and Zona Buenos Aires have averaged at least 40% higher yield than the commercial variety Walsh.

Citrus. Trifoliata stocks have some resistance to brown rot gummosis and improve the quality of the fruit borne by the scion.

Papaw. A breeding programme is in progress for testing material from overseas and developing pure lines and hybrids from local strains.

Strawberries. Plants derived from Phenomenal may be useful for developing varieties with a shorter cropping period.

Grape. Trials of the main commercial varieties grafted on to phylloxera-resistant stocks are in progress.

Onion. In bulb-sett trials at Gatton the smallest setts gave the best results and the variety Earligold showed most promise.

Lettuce. Imperial Triumph has performed well at Redlands. Pennlake is a new early-maturing type derived from Great Lakes.

Pumpkin. Breeding to improve the quality and uniformity of the Beaudesert pumpkin is in progress, and was initiated using six different seed sources.

Cucumber. Palmetto showed good resistance to downy mildew but was susceptible to anthracnose.

Tomato. A new Rutgers selection which maintains its fruit size until the end of the peak harvesting period is to supersede Q 4. New Hawaiian types have shown promise for the cool uplands of the Granite belt and the new Southland variety from the USA is resistant to *Fusarium* wilt. Strain 147 with the *pimpinellifolium* character for nematode resistance will soon be available for trials. Lines from a cross between Bowen Globe and Q 3 produce good fruit and have characters suited to the dry tropics.

Bean. Brown Beauty remains the dominant commercial variety. Strain 17 from Brown Beauty is now available for the production of certified seed. It yields well and is resistant to some bean diseases. Selection within Brown Beauty for resistance to anthracnose strains 1 and 2 is meeting with some success.

Cowpea. Resistance to stem rot has been found in Cristaudo, CPI 9432 and an unnamed hybrid (Victor x Large White x Skewbald x Poona). As a green-manure crop in the Innisfail district the hybrid is equal to Cristaudo and superior to Poona and Reeves. The Black cowpea performed best at Bilaela.

Soya bean. Nanda was the leading variety in trials.

1750 **Annual Report of the Department of Agriculture, Tasmania, for 1952-53 (1953) : Pp. 36.**

Wheat. In breeding for resistance to stem rust at the Cressy Research Farm, a new series of crosses is now in the first stage of selection; seven wheats representing four different sources of resistance were used in crosses with the high yielding but susceptible varieties Macquarie, Pinnacle, Braemar Velvet and Ghurka. In work on the development of a variety suitable for bread making, one promising hybrid, 30,2090 (Cadia x Cross 7), has already been produced; its quality is, however, liable to be affected by varying seasonal conditions. Other hybrids are now being subjected to a preliminary yield trial.

Pasture plants. Local and introduced lines of perennial ryegrass and white clover are under investigation. A cocksfoot selection is undergoing extensive trial.

Potato. The first crosses in the recently initiated breeding scheme were made at the Tewkesbury Potato Station; Brownell and Brownell hybrids are being crossed with disease resistant varieties.

1751 MEYER, K.

Prof. Dr. Fr. Berkner zum 80. Geburtstag. (To Prof. Dr. Fr. Berkner on his 80th birthday).

Z. Acker- u. PflBau 1954 : 97 : 261-66.

An account is given of the life and work of F. Berkner, who developed the early, drought-resistant variety Berkners Kontinentalweizen [Berkner's Continental wheat] and the high yielding Berkners 310 wheat, and was responsible for the introduction of soya bean cultivation into Silesia.

1752 HOFFMANN, W.

Mutation und Polyploidie in der Pflanzenzüchtung. (**Mutation and polyploidy in plant breeding**).

Kühn-Archiv 1953 : 67 : 17-32.

The role played in evolution by chance mutations is discussed and the importance of mutations for the plant breeder stressed. Under natural conditions, polyploid strains are more capable of adapting themselves to new or unfavourable conditions than are diploids, and are consequently of considerable evolutionary interest. Finally, the use of colchicine to produce polyploid forms of cultivated plants is discussed.

1753 BANGA, O.

Punten in het veredelingswerken die de aandacht verdienen. (**Points in breeding technique that deserve consideration**).

Tuinbouw 1949 : 4 : 38-41; 72-74.

A popular account of factors to be taken into account in breeding improved varieties is presented, special emphasis being laid upon disease resistance and adaptation to environment. Incompatibility and deterioration due to inbreeding are discussed.

1754 BELL, G. D. H.

Agricultural crops: quality versus quantity.

Nature, Lond. 1954 : 173 : 199-200.

An account of the second Crop Conference held in Cambridge by the National Institute of Agricultural Botany during December 1953 is presented (cf. Abst. 962).

1755 **Meeting of the Assinseel Council in Paris, December 1953** : Pp. 12. (Mimeographed).

Among the subjects discussed at this meeting were the possibility of applying plant patent laws to fruit and cut flowers and the question of breeders using patented varieties as future breeding material. Holland, Germany and Spain have recently drafted or passed laws affording a measure of protection to breeders. The Austrian, French and Danish breeders' associations have become members of Assinseel.

1756 Le Centre de Recherches Agronomiques de Bingerville. (**The Agronomic Research Centre of Bingerville**).

Bull. agric. Congo belge 1953 : 44 : 1157-58.

The establishment, function and work of this station are briefly recorded. Research on coffee and cacao has been concentrated mainly on selection and the study of environment and the utilization of high yielding varieties under optimum conditions of climate.

1757 KRISHNASWAMY, N., RAMAN, V. S., SHETTY, B. V. & CHANDRASEKHARAN, P. **Chromosome numbers of some Indian economic plants.**

Curr. Sci. 1954 : 23 : 64-65.

The following chromosome numbers are reported: *Garcenia tinctoria*, $2n = ca. 80$; *G. cambogia*, $2n = ca. 58$; three types of *Vitis vinifera*, $2n = 38$; *Tetrastigma sulcatum*, $2n = 22$, *T. lanceolarium*, $2n = 44$; *Cissus pallida*, $2n = 26$; *C. heyneana*, $2n = 28$; *C. glauca* and *C. discolor*, $2n = 24$; *Solanum pubescens*, $2n = 24$; *Monstera deliciosa*, $2n = 48$; *Sorghum virgatum* (?), $2n = 20$; *Rotboellia exaltata*, $n = 18$; *Setaria palmifolia*, $2n = 54$; *Pennisetum subangustum*, $n = 18$; *Oryza granulata*, *O. breviligulata* and *O. brachyantha*, $2n = 24$.

1758 BOOM, B. K.

Internationaal reglement voor de naamgeving van gekweekte planten. (**International code of nomenclature for cultivated plants**).

Meded. Inst. Vered. TuinbGewass. 1953 : No. 52 : Pp. 25.

This is an account in Dutch of the new code of nomenclature for cultivated plants reviewed on p. 142 above.

1759 LIER, O. & RASTEN, J.

Stamsædavlén i Norge. (**Pedigree seed production in Norway**).

Tidsskr. norske Landbr. 1954 : No. 1-2 : 3-32.

The history, development and organization of

the production of officially controlled pedigree seed in Norway are described, special sections of the report being devoted to: institutions and firms formerly or now engaged in the propagation of pedigree seed; Norwegian seed farms; the National Councils for Pedigree Seed Production and for Commercial Seed; relevant laws and regulations; and the application of official seed control to self and cross fertilized crops and to potatoes.

- 1760 KOCH, L.
Combined plant introduction for western Europe?

Euphytica, Wageningen 1953 : 2 : 207-10.

As most European crops are of foreign origin it is suggested that European countries should cooperate to locate and preserve strains of economic plants that might be lost by the opening up of primitive countries.

- 1761 NILSSON-LEISSNER, G.
Introduktion av växtmaterial från främmande länder. Frågan belyst med baljväxtarterna som exempel. (**The introduction of plant material from foreign countries. Illustration of the question by the example of leguminous species**).
K. LantbrAkad. 1953 : 92 : 379-93.

Legumes in Agriculture, by R. O. Whyte, G. Nilsson-Leissner and H. C. Trumble (cf. *PBA*, Vol. XXIII, p. 665) provided the main basis of this paper, in which the author also discusses his two years' experience as seed specialist of FAO. In his view, the planned introduction of new species and strains of cultivated plants should prove advantageous to agriculture in northern Europe.

- 1762 ŠOMOŠ [SOMOS], A.
(**The results of acclimatization of new plants in Hungary**).
Za socialist. seljskohozjaistv. Nauk. (For socialist agric. Sci.), Praha 1953 : Ser. A : No. 1 : 50-58. [Russian].

Notes on introductions of sweet potato, cotton, ramie and citrus fruits, besides the crops referred to below, are given.

Kenaf. Early hybrids of *Hibiscus cannabinus*, with good stem yields and a high fibre extraction, have been obtained.

Groundnut. Breeding for earliness, hardiness and high yield has begun, and some productive hybrids have been obtained. Forms with the bush habit proved more adapted to Hungarian conditions than prostrate forms.

- 1763 (**Introduction of new cultivated plants into Rumania**)

Za socialist. seljskohozjaistv. Nauk. (For socialist agric. Sci.), Praha 1953 : Ser. A : No. 1 : 60-66. [Russian].

Species of forage, oil and fibre plants introduced into Rumania in recent years are listed. The following are among the varieties of fibre plants studied:—

Kenaf. Ikar 2 has been obtained by single plant selection of a population from Indochina. In recent trials it has given 4000-8000 kg. per ha. dried stems yielding 17-19% fibre.

Abutilon avicennae. Ikar 3, selected from Manchurian material, yielded 4500-8900 kg. per ha. dried stems under Moldovian and Muntenian conditions. Its fibre extraction was 17-22%.

- 1764 **Seed production, testing and distribution in European countries.**

OEEC, Paris 1954 : Tech. Assist. Miss. No. 106 : Pp. 183.

Part I presents the general findings and recommendations of the mission of the Organization for European Economic Co-operation on seed production, testing and distribution in 11 member countries of the Organization. Part II gives the reports for the different countries. Seed legislation and regulations, the organization of seed production and distribution, and crop improvement by means of breeding, variety and strain trials, seed testing and certification, control of seed-borne diseases and advisory services are surveyed and assessed, and the various recommendations of the mission are put forward.

- 1765 STEVENSON, F. J. & JONES, H. A.
Some sources of resistance in crop plants.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 192-216.

A list of crop plants for which sources of resistance to diseases and pests have been found in the United States is given, information on the original and present sources of resistance and, when known, the mode of inheritance being provided for each disease. Further information concerning the varieties and selections listed may be obtained from the State Agricultural Experiment Stations. In view of the general usefulness of the list and the fact that the literature on many of the diseases is scanty or nonexistent, the individual crops and diseases referred to are listed below.

Wheat. Resistance to *Xanthomonas translucens* var. *undulosum*, *Tilletia* spp., *Urocystis tritici*, *Puccinia rubigo-vera* var. *tritici*, *P. graminis* var.

tritici, *Ustilago tritici*, *Erysiphe graminis*, *Septoria tritici*, mosaic.

Oats. *Colletotrichum graminicola*, *Pseudomonas striafaciens*, *Ps. coronafaciens*, *Ustilago avenae*, *U. kolleri*, *Puccinia coronata* var. *avenae*, *P. graminis* var. *avenae*, *Helminthosporium avenae*, *H. victoriae*, *Erysiphe graminis* var. *avenae*, *Pythium debaryanum*, *Leptosphaeria avenaria*, mosaic, red leaf (yellow dwarf) virus, oat blast.

Maize. *Physoderma zeae-maydis*, *Diplodia zeae*, *Gibberella zeae*, *Helminthosporium carbonum*, *H. turcicum*, *H. maydis*, *Puccinia polysora*, *P. sorghi*, *Pythium* spp., *Penicillium oxalicum*, *Ustilago maydis*, *Bacterium stewartii*.

Barley. *Ustilago hordei*, *U. nigra*, *U. nuda*, *Puccinia hordei*, *P. graminis*, *Pyrenophora teres*, *Erysiphe graminis*, *Gibberella zeae*, *Rhynchosporium secalis*, *Helminthosporium sativum*, *H. gramineum*.

Rice. *Piricularia oryzae*, *Helminthosporium oryzae*, *Cercospora oryzae*.

Orchard grass. *Scolecotrichum graminis*.

Timothy. *Puccinia graminis*.

Smooth Brome. *Pyrenophora bromi*.

Mountain brome. *Ustilago bullata*.

Tall fescue. *Puccinia coronata*.

Meadow fescue. *Puccinia coronata*.

Bahia grass. *Helminthosporium sativum*.

Sand bluestem. *Puccinia* spp.

Sudan grass. *Pseudomonas andropogoni*, *Colletotrichum graminicola*, *Gloeocercospora sorghi*, *Helminthosporium turcicum*.

Slender wheat grass. *Ustilago bullata*, *Puccinia rubigo-vera*, *P. glumarum*, *P. graminis*.

Western wheat grass. *Puccinia rubigo-vera*.

Tall oat grass. *Puccinia rubigo-vera*.

Side-oats grama. *Puccinia vexans*.

Blue grama. *Puccinia vexans*.

Buffalo grass. *Helminthosporium inconspicuum*, *Puccinia kansensis*.

Lucerne. *Corynebacterium insidiosum*, *Ascochyta imperfecta*, *Fusarium* sp., *Sclerotinia trifoliorum*, *Peronospora trifoliorum*, *Pseudopeziza medicaginis*, *Rhizoctonia* sp., *Uromyces striatus*, *Colletotrichum* sp., *Pseudopeziza jonesii*, yellow virus, pea aphid, dwarf disease.

Large hop clover. *Erysiphe polygoni*.

Red clover. *Sclerotinia trifoliorum*, *Kabatiella caulivora*, *Erysiphe polygoni*, *Colletotrichum trifolii*, snow mould.

Subterranean clover. *Erysiphe polygoni*.

White clover. *Sclerotinia trifoliorum*.

Lespedeza. *Microsphaera diffusa*.

White sweet clover. *Mycosphaerella lethalis*, *Sclerotinia trifoliorum*, *Ascochyta caulicola*, *Cercospora davisii*, *Phytophthora cactorum*, *Colletotrichum trifolii*.

Lupin. *Glomerella cingulata*.

Potato. *Erwinia phytophthora*, *Pseudomonas solanacearum*, *Corynebacterium sepedonicum*, *Streptomyces scabies*, *Phytophthora infestans*, *Verticillium albo-atrum*, *Synchytrium endobioticum*, aphids, hopperburn, leaf roll, net necrosis, viruses A, X and Y.

Sweet potato. *Fusarium hyperoxysporum*.

Cotton. *Verticillium albo-atrum*, *Rhizoctonia solani*, *Meloidogyne* sp.

Flax. *Melampsora lini*, *Fusarium lini*, *Asterocystis radialis*.

Sugar cane. *Physalospora tucumanensis*, *Pythium arrhenomanes*, mosaic.

Sorgo. *Colletotrichum graminicola*.

Sugar beet. *Aphanomyces cochlioides*, *Cercospora beticola*, *Peronospora schachtii*, curly top.

Tobacco. *Pseudomonas solanacearum*, *P. tabaci*, *Thielaviopsis basicola*, *Phytophthora parasitica*, mosaic.

Hops. *Pseudoperonospora humuli*.

Peppers. *Xanthomonas vesicatoria*, *Pseudomonas solanacearum*, *Phytophthora capsici*. *Sclerotium rolfsii*, *Fusarium annuum*, *Meloidogyne* spp., tobacco etch virus, Hawaiian pepper virus, Puerto Rico mosaic virus, tobacco mosaic.

Linseed. *Melampsora lini*, *Fusarium lini*.

Safflower. *Puccinia carthami*, *Phytophthora dreschleri*.

Apple. *Erwinia amylovora*, *Venturia inaequalis*, *Gymnosporangium juniperi-virginianae*.

Pear. *Erwinia amylovora*, stony pit.

Apricot. *Monilinia laxa*.

Peach. *Xanthomonas pruni*, *Sphaerotheca pannosa*, *Meloidogyne* spp., mosaic.

Walnut. *Xanthomonas juglandis*, *Hendersonula toruloidea*, *Phytophthora cactorum*, *Paratylenchus vulnus*, *Cacopaurus pestis*.

Black walnut. *Marssonina juglandis*.

Pecan. *Cladosporium effusum*, *Mycosphaerella caryigena*, bunch disease.

Chinese chestnut. *Endothia parasitica*, *Phytophthora cinnamomi*, *Cryptodiaporthe castanea*, *Botryosphaeria ribis* var. *chromogena*.

Filbert. *Xanthomonas corylina*, *Labrella coryli*.

Peanut. *Cercospora arachidicola*.

Raspberry. *Elsinoe veneta*, *Pucciniastrum americanum*, *Septoria rubi*, aphids carrying mosaic.

Blackberry. *Cercospora rubi*, *Mycosphaerella rubi*, *Gymnoconia interstitialis*, *Verticillium albo-atrum*.

Blueberry. *Physalospora corticis*.

Strawberry. *Diplocarpon earliana*, *Mycosphaerella fragariae*, *Phytophthora fragariae*, *Verticillium albo-atrum*.

Cranberry. *Chlorogenus vaccinii*.

Grape. *Plasmopara viticola*, *Uncinula necator*, *Sphaceloma ampelinum*, *Guignardia bidwellii*.

American elm. Phloem necrosis.

European field elms. *Ceratostomella ulmi*.

White pine. *Cronartium ribicola*.

Onion. *Aspergillus niger*, *Peronospora destructor*, *Pyrenochaeta terrestris*, *Alternaria porri*, *Colletotrichum circinans*, *Urocystis cepulae*, yellow dwarf.

Asparagus. *Puccinia asparagi*.

Cruciferous vegetables. *Fusarium oxysporum* f. *conglutinans*, *Plasmodiophora brassicae*, mosaic.

Spinach. *Peronospora effusa*, *Fusarium oxysporum* var. *spinaciae*, cucumber virus 1.

Lettuce. *Bremia lactucae*, *Erysiphe cichoracearum*, brown blight, tipburn, mosaic.

Celery. *Cercospora apii*, *Septoria apii-graveolentis*, *Fusarium apii*.

Musk melon. *Alternaria cucumerina*, *Pseudoperonospora cubensis*, *Fusarium oxysporum*, *Marssonina melonis*, *Erysiphe cichoracearum*, mosaic.

Water melon. *Colletotrichum lagenarium*, *Pseudoperonospora cubensis*, *Fusarium niveum*.

Cucumber. *Erwinia tracheiphila*, *Pseudoperonospora cubensis*, *Cladosporium cucumerinum*, mosaic.

Tomato. *Corynebacterium michiganense*, *Pseudomonas solanacearum*, *Alternaria solani*, *Fusarium bulbigenum* var. *lycopersici*, *Stemphylium solani*, *Phytophthora infestans*, *Cladosporium fulvum*, *Septoria lycopersici*, *Verticillium albo-atrum*, *Meloidogyne incognita*, curly top, mosaic, spotted wilt.

Bean. *Pseudomonas phaseolicola*, *Colletotrichum lindemuthianum*, *Uromyces phaseoli* var. *typica*, *Erysiphe polygoni*, common mosaic, curly top, New York 15 mosaic, pod mottle, southern mosaic.

Lima bean. *Phytophthora phaseoli*, Lima bean mosaic.

Cowpea. *Xanthomonas vignicola*, *Fusarium oxysporum* f. *tracheiphilum*, *Erysiphe polygoni*, *Meloidogyne* sp.

Soya bean. *Pseudomonas glycinea*, *Ps. tabaci*, *Xanthomonas phaseoli* var. *sojensis*, *Peronospora manshurica*, *Cercospora sojae*, *C. kikuchii*, *Diaporthe phaseolorum*, *Corynespora cassiicola*, *Meloidogyne* spp.

Pea. *Erysiphe polygoni*, *Septoria pisi*, *Fusarium oxysporum* f. *lisi*, yellow bean mosaic.

Winter field pea. *Aphanomyces euteiches*.

Peppermint. *Verticillium albo-atrum* var. *menthae*.

Spearmint. *Puccinia menthae*.

1766 BATTIS, C. C. V.

Testing crop varieties for disease resistance—the work of the mycology department at the N.I.A.B.

J. nat. Inst. agric. Bot. 1953 : 6 : 341–45.

A general account of the work of the NIAB in testing varieties of cereals, forage and root crops, pulses and vegetables for resistance to various diseases is given. Special attention is being paid to yellow rust and loose smut of cereals. It is pointed out that a variety resistant to a particular disease in its country of origin may prove susceptible when introduced into Britain, because of the presence of different physiological races of the disease.

1767 COONS, G. H.

Breeding for resistance to disease.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 174–92.

An account is given of the history and advantages of breeding plants for resistance to disease. The techniques used with various crops are described and the nature of resistance is discussed.

1768 KELMAN, A.

The bacterial wilt caused by *Pseudomonas solanacearum*. A literature review and bibliography.

Tech. Bull. NC agric. Exp. Sta. 1953 : No. 99 : Pp. 194.

Strains of *Pseudomonas solanacearum* have been isolated in various countries. Four main types of colonies are known, three being mutant types usually obtained from old diseased tissues. An account of breeding resistant varieties of tobacco, peanut, potato, tomato, egg plant, banana and pepper is given. Grafting susceptible tomato scions on to resistant rootstock has been successful in preventing infection.

1769 BENNETT, C. W.

Viruses, a scourge of mankind.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 15–22.

Virus strains are mentioned in relation to protecting plants by inoculating them with a relatively harmless strain to prevent infection by a more virulent strain.

1770 GILMOUR, J. S. L.

The new code for the naming of cultivated plants.

J. R. hort. Soc. 1954 : 79 : 12–21.

An account is given of the new international code referred to on p. 142 above.

- 1771 VINOT, M. & BOUSCARY, A.
Étude du code international de la nomenclature des plantes cultivées. (**Study of the international code of nomenclature for cultivated plants**). Rev. hort., Paris 1954 : 126 : 996-99.

This is an account in French of the proposals adopted by the thirteenth International Horticultural Congress. (cf. p. 142 above).

- 1772 DAM KOFOED, A.
53. Beretning om Planteavlssarbejdet i Landboforeningerne i Jylland. (**Fifty-third report on plant cultivation under the agricultural associations in Jutland**) : 1953 (1954) : Pp. 630.

Compiled by the Plant Production Committees of the Association of the Jutland Agricultural Societies, this report records local field experiments by the numerous agricultural associations in different parts of Jutland. The crops dealt with include varieties and strains of bread cereals, clover, lucerne, potatoes, root crops and peas (cf. *PBA*, Vol. XXIII, Abst. 1838).

- 1773 Beretning om landboforeningernes virksomhed for planteavl på Sjælland 1953. (**Report on the plant cultivation work of the agricultural associations in Sjælland, 1953**). København 1954 : Pp. 380.

Compiled by the plant production committee of the Sjælland agricultural associations, this report records field experiments conducted in various localities in Sjælland, Denmark. The crops tested include cereals, clover, lucerne, vetch, beets, mangels, swedes and potatoes.

- 1774 **Crop varieties recommended for Ohio in 1954.**

Fm Home Res. 1954 : 39 : No. 286 : 4-7, 14-15.

Varieties of the following crops are recommended and a short description of each is given: wheat, oats, maize, barley, timothy, brome grass, lucerne, red clover and soya beans.

- 1775 JOHNSON, I. J. & BRAGONIER, W. H.
Recommended crop varieties for 1954.

Iowa Fm Sci. 1953 : 8 : No. 6 : 3-6.

A short statement about each of the following crops is made and hybrids and varieties recommended for Iowa are mentioned: wheat, oats, maize, barley, brome grass, Sudan grass, lucerne, red clover, Ladino clover, lespedeza, sweet clover, birdsfoot trefoil, flax and soya beans.

CEREALS

- 1776 BEESLEY, D.
Emphasis on variety.
Herts. agric. J. 1953-54 : 13 : 141-47.
The suitability of the following varieties for conditions in the west of England is discussed: wheat, Hybrid 46, Cappelle Desprez, Bersée, Holdfast, Yeoman, Yga, King II, Ministre, Atle and Fylgia; oats, S 172, S 147, Sun II, Milford, Maldwyn (S 221) and Eagle; and barley, Pioneer, Plumage Archer, Spratt Archer, Earl, Proctor, Carlsberg, Rigel, Herta and Freja.
- 1777 MORRIS, G. P.
Descriptions of wheat and barley varieties.
J. nat. Inst. agric. Bot. 1953 : 6 : 456-60.
Detailed descriptions of Proctor barley and the wheat varieties Cappelle Desprez and King II are given, supplementing the list of descriptions of wheat and barley varieties already published (cf. *PBA*, Vol. XX, Abst. 1256 and Vol. XXIII, Abst. 199).
- 1778 HEINZEL, A.
Die Erzeugung und Verwendung von Getreide-Zuchsorten-Saatgut. (**The production and use of seed of pedigree cereal varieties**).
Kärntner Bauer 1954 : 104 : 99-101.
New varieties of wheat, oats, rye and barley, suitable for cultivation in Carinthia, are listed.
- 1779 Estación Experimental de Aula Dei. Departamento de Cereales. Información sobre datos obtenidos por este departamento en el año agrícola 1952-1953. (**Aula Dei Experimental Station. Cereal Department. Information on data obtained by the department in 1952-53**).
Zaragoza Pp. 21. (Mimeographed).
Further data are given (cf. Abst. 184) on variety trials with wheat, oats and barley. Observations were made on a large collection of wheats, including all Spanish varieties, imported varieties grown in Spain and varieties used as parents in crossing. Data are given on tillering, earliness, resistance to *Puccinia glumarum*, *P. trititica*, *P. graminis* and *Erysiphe graminis*, height and diameter of stem, number of ears per plant, density and other ear characters, and grain dimensions.
- 1780 KOTT, S. A.
(**Instances of conversion of one economic plant species into another**).
Agrobiologija (Agrobiology) 1953 : No. 6 : 81-89. [Russian].
Interspecific conversions of *Avena sativa* var.

inermis into *A. sativa* var. *mutica*, oats into rye, *Lens esculenta* into *Vicia sativa* var. *lensisperma* and *Pisum sativum* into *V. sativa* are reported from Gorki Leninskie, Moscow province.

1781 OINUMA, T.

(Caryomorphology of cereals. XI. Comparative studies of the caryotype in the various genera of cereals).
Senshokutai (Chromosome)/Kromosomo
1952 : No. 14 : 518-24. [Japanese].

Chromosome morphology was studied in representatives of *Agropyron*, *Aegilops*, *Triticum*, *Secale*, *Hordeum* (86 forms), *Avena* and *Bromus*. All the genera of the Hordeae studied, except *Hordeum*, were fairly similar in caryotype. A general correspondence was noted between the caryotypic relationships of the genera and those inferred from taxonomic and hybridization studies.

1782 UNRAU, J.

Cytogenetic effects of 2,4-D on cereals.
Ann. Rep. Canad. Seed Gr. Ass. 1952-53
(1953) : 25-28.

Cytogenetic studies of Olli barley and first generation progeny studies of Thatcher wheat showed that 2,4-D caused considerable cytogenetic changes and approximately 20% variation in type in the F_1 progeny. Pollen sterility in treated plants increases the danger of natural crossing.

1783 KRESS, H.

Deutsche Agrarwissenschaftler berichten aus der Sowjetunion (VI). Fragen der Entwicklungsphysiologie (Stadienlehre) und Jarowisation. [German agronomists report from the Soviet Union (VI). Questions of developmental physiology (phasic theory) and vernalization].

Dtsch. Landw., Berl. 1953 : 4 : 515-18.

The problem of vernalization was discussed with Lysenko and his views on the correlation between frost resistance and length of vernalization, the comparative merits of vernalization of winter, spring and intermediate varieties of cereals and the influence of locality on the degree of vernalization required were obtained.

1784 ÅKERMAN, Å., LINDBERG, J. E. & AUGUSTIN, S.

Undersökningar av kvaliteten hos 1952 års brödsädesskörd. (Investigations on the quality of the bread cereal crop in 1952).

Sverig. Utsädesfören. Tidskr. 1953 : 63 : 475-510.

This annual report (cf. *PBA*, Vol. XXIII,

Abst. 1029), issued by the Cereal Laboratory on behalf of the National Agricultural Council for Sweden, deals with results of chemical analysis and tests of flour quality and baking value of spring and winter wheats and rye varieties of the 1952 harvest. On this occasion, a special section is included on the results of rapid determinations of the quality of spring wheat which, owing to the unfavourable season, had to be harvested late.

1785 **Crop conference at Cambridge.**

Agric. Merch. 1954 : 34 : No. 1 : 31-37.

An account of the proceedings of the crop conference held at Cambridge in December, 1953, under the auspices of the National Institute of Agricultural Botany, is presented. (cf. Abst. 1754).

1786 **1953 Report of the Grain Research Laboratory.**

Ottawa 1954 : Pp. 77.

Wheat. On the basis of chemical tests over three years, CT 181, 712, 713 and 715 were considered equal to Marquis in quality. CT 186 has been named Selkirk. Developed by the Canadian Department of Agriculture from the cross Rh 2265 x Redman³, it is high yielding and resistant to race 15B of stem rust. Of the amber durum wheats, DT 208 and 209 have been retained for further tests as being superior in quality to Mindum. In studies of seven varieties grown in the United States, 357 was placed first. Tolerance of race 15B has been shown by 356 and 357, 356 giving the higher yields.

Barley. Out of 15 varieties and strains, the strains Br 231, 547 and 597 and Lac. 4752 were retained for further testing for quality. Sask. 2248 has been licensed under the name Husky, which is described in Abst. 1993.

1787 THAKUR, C. & SHANDS, H. L.

Spring small grain agronomic response to plant clipping when seeded at two rates and fertilized at two levels of nitrogen.

Agron. J. 1954 : 46 : 15-19.

The effect of cutting upon Moore, Kindred and H55-32 barley varieties, Clinton, State's Pride and Vicland oats and Henry wheat was tested at the University of Wisconsin and its application to reduction of lodging is discussed. State's Pride recovered most quickly. Clinton showed no greater reduction in yield after two cuttings than after one.

- 1788 SIMS, H. J.
Mallee Research Station, Walpeup.
Twenty-first anniversary.
 J. Dep. Agric. Vict. 1953 : 51 : Pt. 12 : 553-63.
 A description of the development of new wheat and oat varieties at the research station and of breeding for disease which have taken place there is included in a general account of the station's work.
- 1789 DICKSON, J. G.
Leaf and head blights of cereals.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 344-49.
 Varieties of wheat, barley, oats and rye which are resistant to *Fusarium* head blight, ergot, *Helminthosporium gramineum*, *H. avenae*, *H. sativum*, *H. victoriae*, *Septoria* blights and *Rhynchosporium* leaf scald are mentioned.
- 1790 ANDES, J. O.
Small grain research strikes at diseases.
 Tenn. Fm Home Sci. 1953 : No. 6 : 5, 9.
 Resistance to root diseases in cereals is being investigated, especially to *Pythium* and to spot blotch in barley. Barley lines resistant to scald have been obtained. It is emphasized that resistance under warmer conditions at the seedling stage is necessary to accord with earlier planting dates.
- 1791 HOLTON, C. S. & TAPKE, V. F.
The smuts of wheat, oats, barley.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 360-68.
 Varieties of cereals resistant to smut diseases have been bred, but breeding is still necessary as new physiological races against which there are no high-yielding resistant varieties are continually appearing.
- 1792 HIRATSUKA, N. & MIYASHITA, S.
[Studies on the rust resistance of cereals. II. Studies on the resistance of *Triticum* plants and related species to black rust of wheat (*Puccinia graminis* f. sp. *Tritici*)].
 Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 185-92. [Japanese].
 Numerous varieties pertaining to the genera *Triticum*, *Aegilops*, *Hordeum*, *Haynaldia*, *Avena* and *Triticum* x *Aegilops* were tested for resistance to race 11 of the above pathogen. Resistance occurred in some varieties of the following species: *T. monococcum*, *T. timopheevi*, *T. vulgare*, *Ae. triuncialis*, *Ae. variabilis*, *Ae. cylindrica*, *Ae. longissima*, *Ae. sharonensis*, *Ae. speltioides*, *Ae. ovata*, *Ae. triaristata*, *Ae. columnaris*, *Ae. caudata* x *Ae. umbellulata*, *Hordeum murinum*, *Haynaldia villosa* and *Avena sativa*.
- 1793 WATERHOUSE, W. L.
Australian rust studies. IX. Physiological race determinations and surveys of cereal rusts.
 Proc. Linn. Soc. NSW 1952 : 77 : 209-58.
 Recent studies at the University of Sydney and elsewhere on the life histories and physiological specialization of stem and leaf rusts of wheats, oats, rye and barley are described, and an account of the appearance of physiological races in different parts of Australia and New Zealand is given. The oat variety Garry is immune from all biotypes of *Puccinia graminis* and *P. coronata* occurring in Australia, and is highly resistant to most races of oat smut.
- 1794 MARTIN, J. H. & SALMON, S. C.
The rusts of wheat, oats, barley, rye.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 329-43.
 A general account is given of breeding wheat, oats, rye and barley for resistance to the common rust diseases.
- 1795 CHRISTENSEN, J. J.
Root rots of wheat, oats, rye, barley.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 321-28.
 Physiological races have been reported in *Helminthosporium sativum*, *Calonectria graminicola*, *Fusarium culmorum*, *F. graminearum*, *Ophiobolus graminis* and *Rhizoctonia solani*. New varieties should be tested in disease gardens for resistance to root rot. The spring wheats Apex, Thatcher and Marquis are quite resistant to the common root rots. Kota, Kubanka and McMurachy Selection are moderately resistant to take-all. The oat varieties Clinton, Benton and Bonda are highly resistant to *H. sativum*.
- 1796 HJELMQVIST, H.
 Ett bidrag till kulturväxternas äldsta historia i Sydsverige. (A contribution to the ancient history of cultivated plants in southern Sweden).
 Bot. Notiser 1953 : No. 4 : 420-30.
 Descriptions are given of impressions of cereal grains in pottery from the Bronze Age in the History Museum in Lund, Sweden. The cereals discussed, with comparative observations on their occurrence in the Stone Age, include: naked and hulled barley, wheat and Einkorn, *Panicum miliaceum* and oats.

- 1797 ROTERS, H.
Leistungssteigerung durch richtige
Sortenwahl bei Sommergetreide. (**In-
creasing the yield of spring cereals
by selecting the correct varieties**).
Dtsch. Landw. Berl. 1953 : 4 : 640-42;
1954 : 5 : 7-12.

An account of varieties officially approved for cultivation in East Germany is given, together with comprehensive data on yield, quality of grain, maturity, disease resistance and soil requirements. Of the spring wheats, Peko gives the highest yields of both grain and straw, followed by Koga and Capega. Highest yielders among the oats are Flämingsgold, Fläminstreue, Pfiffelbacher Gelb [Pfiffelbach Yellow], Kleinwanzlebener Intensiv, Kleinwanzlebener Universal, Goldregen III [Golden Rain III] and Vienauer Weiss [Vienau White]. Petkus spring rye is superior among the rye varieties. Freya, Elsa, Saale, Morgenrot [Morning Red] and Hohenfinower Vierzeilige [Hohenfinow Four-rowed] give the highest yields among the barleys.

- 1798 McKENZIE, M. G. (JUN.), PEEDIN, C. D. & MOORE, R. P.
Measured crop performance 1952.
Bull. NC agric. Exp. Sta. 1953 : No. 381 :
Pp. 40.

The results of tests of wheat, oats, maize, barley and cotton carried out in several districts are given. On the basis of these tests suitable varieties and hybrids are recommended for North Carolina.

- 1799 **Varieties of spring wheats and spring barleys. Recommended lists for 1954.**

Fmrs' Leaflet. nat. Inst. agric. Bot. 1954 :
No. 2 : Pp. 4.

Varieties recommended for growing in Britain after trials at various centres are listed, and a brief description of each is given. Carlsberg, Herta and Rika are barley varieties newly included among those provisionally recommended.

WHEAT

- 1800 **Varieties of winter wheats. Recommended list for 1954.**

Fmrs' Leaflet. nat. Inst. agric. Bot. 1954 :
No. 8 : Pp. 4.

Brief notes are given on varieties of general and limited use recommended after trials at a wide range of centres in Britain. Masterpiece and Minister have been added to those provisionally recommended this year.

- 1801 PERINI, D. & VERONA, O.
Sulla diffusione in Italia delle vecchie e nuove razze di frumento. (**The distribution in Italy of old and new varieties of wheat**).

Ann. Sper. agr. 1954 : 8 : XLIII-LXXVI.

Statistics are presented showing the areas in different parts of Italy which are sown with the old Italian wheats and those under modern wheats. Some areas sow none of the older wheats, whereas in many mountainous districts they remain on over 60% of the area under wheat on the mainland and up to 90% in Sicily. In northern Italy the earlier bred varieties like Damiano Chiesa and Villa Glori are being rapidly superseded by new ones such as S. Pastore, and also Impeto, Tevere, Roma and Autonomia.

- 1802 AMMANN, E.
Zum Sortenproblem für den Frühljahrsanbau. (**On the problem of varieties for spring sowing**).

Schweiz. landw. Mh. 1954 : 32 : 77-78.

Data on yield, maturity, quality, and resistance to lodging, diseases and pests are presented for varieties of spring wheat, oats and spring barley recommended for cultivation in Switzerland by the Swiss Seed Growing Association. Yield, maturity and resistance to virus diseases of a number of recommended potato varieties are also given.

- 1803 NICHOLSON, G.
Wheat varieties recommended for 1954 sowing.

Agric. Gaz. NSW 1954 : 65 : 5-11, 38-40.

Varieties recommended for 13 zones of New South Wales are listed and briefly described. Those suitable for hay and green fodder are also mentioned. Compared with the 1953 list, Kendee has been deleted from the northern zones and Insignia has been included for the western portion of Riverina.

- 1804 ROCA, R.
Posibilidades de la genética triguera. (**Possibilities of wheat genetics**).

Rev. Inst. agríc. catal. 1953 : 102 :
253-54.

An interview is reported with J. M. Soler y Coll, Head of the Technical Agricultural Service of Barcelona, who refers to work that has been done in improving the variety Montjuich, in acclimatizing Italian wheat hybrids, and in developing the three varieties Montserrat, Montnegre and Montsech, which are high yielding forms adapted to local conditions, and

characterized by good quality and resistance to rust and shedding.

1805 ÅKERMANN, Å.

Svalöfs höstvetesorter Skandia III elit B och Odin. (**The Svalöf autumn wheat varieties Skandia III elite B and Odin.**)

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : p. 29.

The performance and agronomic characteristics of the above wheats in 1951 and 1952 in Sweden are recorded with notes on their suitability for various districts and on the best varieties to replace them where they have proved unsuitable.

1806 VALDEYRON, G.

Enseignements techniques à tirer de la campagne de céréales 1952-53 en Tunisie. (**Technical deductions to be drawn from the cereal season 1952-53 in Tunisia.**)

Tunis. agric. 1953 : 54 : 127-38.

This outline of the past history and present trend of cereal production in Tunisia contains information on the yields and quality of various well known wheats produced in that country (cf. *PBA*, Vol. XXIII, Abst. 2553), with comments on their desirable or undesirable features, e.g. mealy endosperm or low commercial value. The highly productive and hardy soft wheat EAP 63 A could not be placed on the Variety Register owing to its mediocre quality.

1807 SIM, J. T. R.

Wheat production in South Africa.

Bull. Dep. Agric. S. Afr. 1953 : No. 334 : Pp. 87.

Chapter 5 of this bulletin, intended for farmers, gives a short popular account of wheat breeding and its problems in South Africa, and also descriptions of the chief commercial varieties and some new varieties recently released by the Potchefstroom College of Agriculture. The latter comprise Maluti, Magaliesberg, Penkop, Rooi Spitskop, Wit Spitskoop and Gonveld (cf. *PBA*, Vol. XXIII, Abst. 2551).

1808 SALMON, S. C., MATHEWS, O. R. & LEUKEL, R. W.

A half century of wheat improvement in the United States.

Advanc. Agron. 1953 : 5 : 1-151.

Progress in wheat improvement in the United States is surveyed under the following main headings: acreage, yield per acre and production; improvement in cultural practices; the role of improved varieties; improvements in methods of breeding; control of diseases; and control of

insect pests. The section on breeding methods presents an account of (1) early methods of breeding, (2) objectives in breeding, (3) resistance to disease, insect and weather hazards, (4) testing for comparative yields, and (5) techniques for measuring quality.

1809 NOORDHOFF, L. J.

Taylor highest yielder in South's wheat tests.

Sth. Seedsman 1954 : 17 : No. 1 : p. 52.

A brief account is given of the variety Taylor and of its good performance in southern trials (cf. Abst. 1810).

1810 PADEN, W. R. & ESKEW, E. B.

Anderson and Taylor. Two new wheat varieties.

Circ. SC agric. Exp. Sta. 1953 : No. 92 : Pp. 8.

A further account is given of the variety Anderson (cf. *PBA*, Vol. XXII, Abst. 1806).

Taylor was selected at Beltsville, Md. and the South Carolina Agricultural Experiment Station from a strain produced by J. W. Taylor. This strain originated from a cross between Trumbull and Frondosa. Taylor is high yielding, intermediate in growth habit, sufficiently winter hardy for Piedmont and coastal areas of S. Carolina, fairly resistant to leaf rust and moderately resistant to stem rust; it is susceptible to mildew and moderately susceptible to mosaic. Results are given of trials of Anderson, Taylor and six other varieties in 1948-52.

1811 **Three new small grains for Texas.**

Seed World 1953 : 73 : No. 12 : p. 31.

Bowie and Travis fodder wheats and Newturk flax have been introduced by the Texas station and the United States Department of Agriculture. The wheat varieties are resistant to leaf and stem rust and are higher yielding than other fodder varieties. Bowie grain has a higher protein content than Austin. They are selections from a cross between introductions from South America and British East Africa. Newturk is cold resistant and adapted to the central Bracklands.

1812 **New Oklahoma wheat is to be available to growers in 1955.**

What's New Crops Soils 1953 : 6 : No. 3 : p. 21.

A new hard winter variety Concho, superior in yield to other varieties and recommended for local conditions, is announced by the Oklahoma Agricultural Experiment Station. It has good baking and milling qualities, is highly resistant

to bunt, comparatively resistant to leaf rust and has moderately stiff straw.

1813 BJAANES, M.

Forsøk med høstkveite. (**Trials with autumn wheat**).

Meld. Stat. Forsøksg. Møistad 1946 and 1947 (1953) : H58-H76, H114-H118.

In the course of wheat breeding in Norway, the above trials were carried out at Møistad Experimental Station and at Jønsberg, Vidarshov and Vollebakk.

Sigyn [Heid (Stavropolsk 193) x Labors elite 05] and Heid were the hardiest varieties, but the former, owing to its very stiff straw, greatly exceeded the latter in grain yield. Only 0136, a sister line of Sigyn, surpassed Sigyn, but it has not such stiff straw and did not overwinter so well. Follo (055-2B30), not so extensively tested, was not so winter hardy as Sigyn and was very liable to lodge. The Svalöf wheat Gluten, with its short very stiff straw, lodged least of all the varieties.

The baking quality of Sigyn, Heid and 0136 was above average, but not equal to that of Gluten, though the difference between Gluten and 0136 was slight. Heid appears to have transmitted its good baking quality to both Sigyn and 0136. All the varieties tested, except the land variety Enger, have fairly large grain.

Heid, as much superior to the rest, is recommended for common use in the district.

Tables are also given showing the performance of a number of other sister lines of Sigyn.

1814 BJAANES, M.

Trym 02400, en ny vårkveitesort for Oplandenes lavlandsdistrikter. (**Trym 02400, a new spring wheat variety for the lowland districts of Opland**).

Meld. Stat. Forsøksg. Møistad 1946 and 1947 (1953) : H77-H93, H118-H125.

The breeding experiments referred to in the 1944 report of the Møistad Experimental Station, Norway, are here reviewed together with earlier and subsequent results, the whole period covered being 1938-47.

Two lines, 02344 and 02400, from a cross of the Canadian spring wheat Huron with the Swedish variety Fylgia, are specially recommended for their yield in trials with Diamant II [Diamond II]. Line 02400 has nearly as stiff straw as Diamant II, which it exceeded in yield by 6%. It is also more resistant to lodging than 02344. Neither line quite equalled Diamant II in baking quality but the difference was small. Line 02400, released as a new variety under the name Trym, is awnless and has large, brown,

well-filled ears with large, light-yellow grain; it is recommended for low-lying districts in Hedemark and Opland (cf. *PBA*, Vol. XXI, Abst. 2522).

1815 ÅKERMAN, Å.

Vårveteodling. (**Spring wheat cultivation**).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 9-11.

The increased acreage under spring wheat in Sweden since 1920 is partly due to the advances made in breeding for increased yield and strength of straw. Though an adequate combination of these two characters with good quality grain and short growing period has not yet been achieved, the new variety Fylgia II (Extra Kolben II x Aurore) has equalled Fylgia in grain yield and has surpassed it in stiffness of straw and baking quality.

1816 AYAD, M. A. G. [AYAD, M. 'A.UL G.].

Inheritance studies of some qualitative and quantitative characters in Egyptian varieties of wheat.

Proc. Egypt. Acad. Sci. 1952 : 8 : 26-38.

The inheritance of the characters mentioned below was studied at Alexandria University in the F_1 and F_2 progeny of the following crosses: Hindi 62 x Hindi Immune for head type, spike density and plant height; Giza 139 x Hindi 62 for glume colour, date of heading, spike density and plant height; and Cross 951A x Hindi Immune for glume colour and waxiness. Non-waxiness and the yellowish glume colour of Giza 139 were monogenic and dominant. The red glume colour of Cross 951A and the non-clavate head of Hindi 62 were dominant and were governed by two pairs of factors giving a 9:7 ratio in the F_2 . For spike density and height of plant the F_2 frequency curve was continuous. There was partial dominance of lax spike in both cases, partial dominance of shortness in the Hindi 62 x Hindi Immune cross and of tallness in the Giza 139 x Hindi 62 cross. Earliness of heading was dominant, giving a 15:3 ratio in the F_1 . It is suggested that two pairs of factors, *II* (earliness) and *LL* (lateness), are involved, *I* being epistatic to *L*. A correlation analysis indicated that all these characters and rust resistance, which had been previously studied (cf. Abst. 1873), were inherited independently.

1817 **Standardized system of gene symbols in wheats.**

Sci. Coun. Jap. 1953 : Pp. 8.

Tables showing the recommended symbols for

morphological and physiological characters in hexaploid, tetraploid and diploid wheats and the manner of inheritance of these characters are given. A table showing linked characters and the cross-over value is included.

- 1818 JONES, J. W. & JENSEN, N. F.
Behavior of the hairy-neck character in wheat-rye hybrids.
 Agron. J. 1954 : 46 : 78-80.

The inheritance of hairy neck, i.e. pubescent peduncle, was studied in crosses of the winter wheat Alaskan with three wheat-rye lines from Cornell Sel. 779b10-8-6, which has the pedigree [(Honor wheat x Rosen rye) x Honor] x Yorkwin. With the exception of one individual, all the plants of the wheat-rye parental lines were found to possess a hairy neck, although the degree of pubescence was somewhat variable. In two of the crosses hairy neck was inherited as a simple Mendelian character showing dominance. The possible cytological basis of this mode of inheritance is discussed. In the third cross, approximately one half of the F_2 plants had hairy necks; the F_3 percentages of hairy-neck, segregating and smooth-neck lines were 11.3, 46.2 and 42.5%, respectively. Hairy neck was not associated with any reduction in plant height, yield or culm number. Glume colour was inherited as a monogenic character, the bronze glumes of Alaskan being dominant over the white ones of the wheat-rye derivatives. The purple straw colour of Alaskan was dominant over the white straw of the other three parents and was also monogenically determined.

- 1819 SANDO, W. J. & LOWTHER, C. V.
Reactions at Beltsville, Maryland, of segregates from hybrids of wheat x *Agropyron elongatum* x wheat to eight races of *Puccinia graminis tritici*.
 Plant Dis. Repr. 1953 : 37 : 300-01.

Eleven wheat x *A. elongatum* x wheat hybrids were tested for their seedling response to races 11, 15B, 17, 19, 36, 38, 56 and 59 of stem rust in the greenhouse at 70-74° F. With one exception, the hybrids were highly resistant. The selection Chinese x *A. elongatum* x Chinese x rye x Forward exhibited a higher degree of resistance to the eight races than has so far been located in the wheats tested. Five lines were relatively homozygous for their response to all eight races; the remainder segregated for reaction to one or two races. The lines contained a large proportion of plants resistant to

Erysiphe graminis; they were also highly resistant to local races of leaf rust.

- 1820 SANDO, W. J.
Reaction to stem and leaf rust and a soil borne virus of hybrid selections of wheat x *Agropyron* x wheat and wheat x wheat.
 Plant Dis. Repr. 1953 : 37 : 296-99.
 (Mimeographed).

The results of tests of 79 intergeneric, inter-specific and intraspecific selections of *Triticum* for their reactions to stem and leaf rust in different parts of the United States, and also in Mexico and the Virgin Islands, are reported. The selections were tested for their response to a soil-borne virus at Raleigh, NC. Seventy-one of the hybrids involved *A. elongatum*; a number of these intergeneric hybrids also had wheat x rye in their parentage. Selections highly resistant to both rusts usually had the undesirable characters of *Agropyron* but it is thought that these could be eliminated by further crossing to wheat. At Raleigh, the following three among the selections showing resistance to soil-borne virus were also highly resistant to leaf and stem rust at most other centres: Chinese x *A. elongatum* x Harvest Queen and Purple straw; Chinese x rye x Chinese x *A. elongatum* x Rising Sun x Purple straw and Leapland; and Chinese x *A. elongatum* x Arlando and Leapland x Comet 125.

- 1821 WATANABE, Y.
(On meiosis, morphology and fertility in F_1 hybrids obtained from *Triticum timopheevi* x *T. vulgare*).
 Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 173-77. [Japanese].

Nine F_1 hybrids were obtained from crosses between *T. timopheevi*, on the one hand, and *T. vulgare* vars. *erythrospermum* and *erythroleucon* on the other. Numerous univalents appeared at meiosis in the hybrids, the modal value being 12-13; there were usually 1-2 trivalents, and an occasional quadrivalent or quinquevalent was also noted. Self sterility was complete, but seed was set on back-crossing to either parental species. Observations on natural rust infestation suggested that the hybrid inherited the rust resistance of *T. timopheevi*.

- 1822 MORRISON, J. W.
Pollen formation in pentaploid and near-pentaploid wheat hybrids.
 Heredity 1953 : 7 : 419-28.

Meiosis and pollen-grain mitosis were studied in five plants: three pentaploids from *Triticum*

vavilovi x *T. dicoccum*, *T. vulgare* 'H-44-24' x *T. dicoccum* and *T. vulgare* 'Chinese Spring' ($2n = 43$) x *T. dicoccum* 'Vernal', respectively, and a monosomic and trisomic, also from Chinese Spring ($2n = 43$) x Vernal. In the pentaploids 9-14 bivalents were produced at metaphase I. In the $5x-1$ plant, the maximum number of bivalents formed was 13. In the trisomic, a trivalent occurred in 60% of the cells. The univalents behaved similarly in pentaploids and near-pentaploids. At anaphase I some univalents passed undivided to the poles, whereas others split equationally. Both dyads and tetrads had one or more micronuclei, formed by lagging univalents, and in some cells, the centromeres of univalents misdivided at telophase I and II, giving rise to telocentrics which were included in the pollen grains. Pollen grains with chromosome numbers ranging from 14 to 21 were formed in proportions departing slightly from the chance distribution of univalents. The F_2 progeny of the pentaploids had 28-42 chromosomes. Frequencies of distribution of the numbers showed the effects of strong selective elimination.

- 1823 OLÁH, L. v.
Genomanalyse in the hybrid of *Triticum dicoccum* Schnrk. x *Aegilops ventricosa* Tausch.
 Lilloa 1952 : 25 : 605-14.

The sterile F_1 hybrid from the above cross formed 7 to 13 bivalents, pairing often being telosyndetic. It is therefore suggested that one genome of *Ae. ventricosa* is homologous with a genome of *T. dicoccum* and that partial homology exists between the remaining genomes. Revision of the genomic formula of *Ae. ventricosa* and of the systematic position of this species is advocated.

- 1824 KIHARA, H.
(Spelt synthesized from *Triticum dicoccoides* x *Aegilops squarrosa*).
 Senshokutai (Chromosome)/Kromosomo 1949 : Nos. 5-6 : 199-203. [Japanese].

Triplod hybrids were obtained from the above cross, and these, on selfing, gave a few F_2 plants with 42 or 43 chromosomes, presumably through the functioning of unreduced gametes. Fertility of the F_2 hexaploids was high and meiosis quite regular. Plants with 42 chromosomes were obtained from crossing the F_1 hybrids with *T. spelta*; meiosis in these plants was fairly regular but fertility was low, possibly due to the retarded development of these forms. A 41-chromosome plant with fairly good fertility was obtained by

open pollination of the F_1 hybrids; the pollinator is assumed to have been *T. vulgare*.

- 1825 WATERHOUSE, W. L.
Australian rust studies. X. Further breeding work with "Khapli" Emmer wheat, an outstanding source of stem rust resistance.

Proc. Linn. Soc. NSW 1952 : 77 : 331-36.

The *Triticum vulgare* wheat Steinwedel crossed readily with the emmer wheat Khapli. Tests of the F_1 with several races of stem rust showed resistance to the pathogen to be a dominant character.

- 1826 KARAPETJAN, V. K.
(Genetic analyses of the first and second generations of rye-wheat and wheat-rye hybrids).
 Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 35-59. [Russian].

The substance of this paper has been summarized in Abst. 195.

- 1827 NAKAJIMA, G.
(Cytological studies on sterile F_1 plants of *Triticum turgidum* x *Secale cereale*).
 Senshokutai (Chromosome)/Kromosomo 1952 : No. 14 : 525-35. [Japanese].

F_1 hybrids with $2n = 21, 22, 22 + 1f$ or 23 chromosomes were obtained. The chromosome numbers above 21 are believed to be due to duplicated or fragmented rye chromosomes. The mode for bivalent frequency was at 0_{II} for the 21-chromosome hybrids, but moved over to $1_{II}-3_{II}$ for the $22 + 1f$ and 23 chromosome hybrids. An instance in which seven large chromosomes, presumably from the rye parent, were extruded into the cytoplasm at telophase, the remaining chromosomes forming two daughter nuclei, was noted in one of the 21-chromosome hybrids.

- 1828 NAKAJIMA, G.
[Cytogenetical studies of F_1 plants of *Triticum dicoccum* ($n = 14$) x *Secale cereale* ($n = 7$)].
 Senshokutai (Chromosome)/Kromosomo 1951 : No. 11 : 410-15. [Japanese].

Two F_1 plants were obtained by pollinating *T. dicoccum* var. *atratum* with rye. These plants were intermediate between the parents morphologically and had $2n = 21$ chromosomes. At meiosis, 21_I was the most frequent configuration, but occasional bivalents were noted. Sterility was almost complete.

- 1829 NAKAJIMA, G.
[Cytological studies of F_1 plants of (*Triticum turgidum* x *Secale cereale* F_1) x *Secale cereale*].

Senshokutai (Chromosome)/Kromosomo 1951 : No. 11 : 416-20. [Japanese].

Hybrids with 25 or 26 chromosomes were obtained by pollinating male-sterile hybrids of *T. turgidum* x *S. cereale* with rye. From studies of the metaphase configurations of the back-cross hybrids, it is inferred that the genomic constitutions of the F_1 hybrids were $R_1 + (AB - 2)$, $(R - 1) + (AB - 2)$ or $R + (AB - 3)$.

- 1830 NAKAJIMA, G.
[Cytological studies on F_1 plants of (*Triticum turgidum* x *Secale cereale* x *T. vulgare* F_1) x *T. turgidum*].
Ikushugaku Zasshi/Jap. J. Breeding 1952 : 2 : 31-36. [Japanese].

Chromosome counts of $2n = 30, 31, 32$ or 34 are reported for the above cross. The number of bivalents ranged from 11 to 16. It is concluded that the hybrids each contain the AABB genome in combination with a variable number of D and R chromosomes.

- 1831 O'MARA, J. G.
The cytogenetics of Triticale.
Bot. Rev. 1953 : 19 : 587-605.

An account is given of the origin, cytology and genetics of hybrids and allopolyploids of *Triticum aestivum* and *Secale cereale*. The possibilities of introducing desirable rye genes into wheat varieties are discussed.

- 1832 NAKAJIMA, G.
[Genetical and cytological studies on the breeding of amphidiploid types by crossing wheat and rye. IV. Fertility and germination of the seeds in F_2 hybrids of rivet wheat (*Triticum turgidum*, $n = 14$) and rye (*Secale cereale*, $n = 7$), and the external characters and somatic chromosomes of the F_3 plants].
Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 178-84. [Japanese].

Out of 42 individuals of the above cross, 17 were fertile, the chromosome number being $2n = 41$ or 42. In the F_3 , the chromosome number ranged from 39 to 60, the modal value being 41-42. Fertility was highest in individuals with 42-43 chromosomes.

- 1833 WATERHOUSE, W. L.
Australian rust studies. XI. Experiments in crossing wheat and rye.
Proc. Linn. Soc. NSW 1953 : 78 : 1-7.

An account of recent research in Australia on

the crossing of wheat and rye is given, and the practical value of transferring disease resistance from rye to wheat is indicated. The wheat variety Geeralying set as much as 85% grain when pollinated with rye pollen. The F_1 of this cross was highly sterile and, although possessing some of the disease resistance of the rye parent, had a greater resemblance to wheat than to rye.

- 1834 GAUL, H.
Genomanalytische Untersuchungen bei *Triticum* x *Agropyrum intermedium* unter Berücksichtigung von *Secale cereale* x *A. intermedium*. (Analytical genome investigations of *Triticum* x *A. intermedium* including consideration of *S. cereale* x *A. intermedium*).
Z. indukt. Abstamm.- u. VererbLehre 1953 : 85 : 505-46.

Crosses between *A. intermedium* and different species of *Triticum* were made to clarify the genome relationships between the two genera. Differences in the progenies of particular intergeneric combinations were attributed mainly to the heterozygous nature of the *Agropyron* parent. Cytological studies of *Triticum* spp. and *A. intermedium* ($2n = 42$) showed meiosis to be fairly regular. In the hybrid *S. cereale* x *A. intermedium* ($2n = 28$), 6.9-7.8 pairings per cell were observed, of which 0.7-3.0 were bivalents and 0.9-1.7 trivalents, whilst a few quadrivalents also occurred. In this cross, pairing appeared to be attributable to auto-synopsis between two *A. intermedium* genomes, I_1 and I_2 , which seem to be highly homologous. In crosses *A. intermedium* with *T. durum* and *T. dicoccum* $2n = 35$ and 4.2-8.1 pairings per cell were observed, including many trivalents and some quadrivalents. In the cross *T. aestivum* x *A. intermedium* ($2n = 42$), quinquivalents and hexavalents were found and these plants had a higher chiasma frequency; auto-synopsis was also observed.

- 1835 FELLOWS, H. & SCHMIDT, J. W.
Reaction of *Agroticum* hybrids to the virus of yellow streak mosaic of wheat.
Plant Dis. Repr. 1953 : 37 : 349-51. (Mimeographed).

Two tests of the reaction of strains of four *Triticum-Agropyron* hybrids to yellow streak mosaic were carried out at Manhattan, Kans. The four hybrids used are given as (Chinese² x *A. elongatum*) x Pawnee, wheat x *A. elongatum*, wheat³ x *Agropyron* and wheat³ x *A. trichophorum*. The hybrids exhibited a wide diversity of reaction, segregates ranging from complete

resistance to complete susceptibility. Symptomless plants contained the virus, indicating the absence of immunity. The more wheat-like the hybrid, the less resistance was shown. The variability of the wheat-like types, however, suggested that scope for selection for resistance exists. The two *Agropyron* controls, *A. elongatum* and *A. intermedium*, remained free from symptoms.

1836 TARAKANOV, K. N.

(Evolution of hard wheat plants under abnormal conditions).

Agrobiologija (Agrobiology) 1953 : No. 4 : 30-37. [Russian].

Continuing his research on *Hordeiforme* 010 seedlings, trained upon acid substrates (cf. *PBA*, Vol. XXIII, Abst. 2575), the author observed extensive changes in the sixth generation. Many dividing cells of the radicles and some other tissues had chromosome numbers of 14, 16-17, 24-26, 30-32, instead of the normal 28. The experimental plants bore some white grains, the consistency and biological properties of which differed from those of normal hard wheat. Some of the radicles of the white grains were formed entirely of cells with 14 chromosomes. The evidence is discussed in the light of Lipešinskaja's theories on the origin of cells from noncellular living substance (cf. *PBA*, Vol. XXI, Abst. 1509).

1837 MORRISON, J. W.

Interchange by misdivision in *Triticum*.

Canad. J. Bot. 1954 : 32 : 281-84.

MORRISON, J. W.

Interchange by misdivision in *Triticum*.

Heredity 1953 : 7 : p. 446. (Abst.).

An interchanged chromosome and a telocentric arose in the progeny of a monosomic of hexaploid wheat; the occurrence of the former was inferred from quadrivalent and trivalent associations which do not occur in normal monosomics; the telocentric was recognized by its morphology. The data suggested that the interchange resulted from the fusion of two telocentrics from nonhomologous chromosomes.

1838 MAC KEY, J.

Neutron and X-ray experiments in wheat and a revision of the speltoid problem.

Hereditas, Lund 1954 : 40 : 65-180.

A comprehensive account of experiments to compare induced mutability at the diploid and polyploid levels is presented. Common wheat

($6x = 42$) was used as the polyploid representative and barley ($2x = 14$) as the diploid, the dry seeds being subjected to treatment with X rays or neutrons. The wheat varieties treated were Skandia III and Rival. It was not possible to expose differences in mutability at the polyploid and diploid levels by means of X irradiation, on account of the high degree of lethality of this type of radiation. By means of the more purely genetic action of the less lethal neutron treatment, however, it could be demonstrated that wheat produced a higher frequency of phenotypically observable mutations. The maximum frequency of N_2 mutations in barley reached 50% calculated per surviving N_1 plant, whereas values of over 160% were obtained for wheat, without any indication that the maximum frequency had been attained. This higher frequency is attributed to a greater tolerance of chromosome rearrangement and the high recombining ability resulting from this tolerance. The mutations in wheat showed pronounced groupings, in contrast to the random distribution of those in barley. Higher phenotypic stabilization, i.e. buffering ability, and the greater tolerance of chromosomal rearrangement, cause a different expression of mutability in wheat compared with barley. The buffering ability is higher for fundamental characters, such as chlorophyll production, because of polymerization; the observable mutability therefore affects less basic attributes than in barley. Except for the occurrence of awns and adventitious spikelets, all mutations in *T. vulgare* can be classified as changes in the length or thickness of existing organs, or as merely physiological alterations. Mutations in barley, on the other hand, involve much more drastic changes. The mutations induced in wheat were generally dominant or partly dominant, whereas the barley mutations were nearly all recessive. In evolution, polyploidy endows the plant with a higher genotypic variation than diploidy but imposes narrower phenotypic limits.

Induced speltoid, dense-eared, lax-eared, bearded, short-strawed and chlorophyll types are analysed. A few miscellaneous mutants are also described. The most common mutants were of the speltoid, lax-eared and short-strawed types. Point mutations, visible deficiencies, deficiency-duplications, aneuploidy and other chromosomal changes were demonstrated among the several different types of mutants. Dense-eared, lax-eared and short-strawed types each depended upon alterations involving several distinct loci. Speltoid, compactoid and bearded

forms, and also the transition from the spring to the winter habit, were each ultimately controlled by a single gene.

Production of speltoids is conditioned by the inactivation or loss of the gene *Q* in the long arm of chromosome IX. The author replaces the former classification of speltoids into types A, B and C by two groups only, deficiency and monosomic speltoids, since the distinction between types A and C was found to be untenable. Speltoids can be caused by a single deficiency, deficiency-duplication, and probably also by gene mutation and chromosome substitution. Spontaneous deficiency speltoids are believed to be chiefly the consequence of pairing behaviour in the polyploid condition. No definite indication of localization of breakage or of crossing over in the long arm of IX was obtained from the induced def speltoids. Compactoids, all of which are due to duplication of *Q*, can be produced by chromosome substitution, addition, simple duplication, deficiency-duplication or isochromosome formation. A table is given for the compactoids, listing the terms proposed by the author for the representatives of the five main types, genotypes, segregation ratios, and terms used by previous investigators.

Chromosome IX was used as a test chromosome in a study of induced and spontaneous mutation. The data suggested that the conformity between natural and artificial speltoid mutations may be applicable only to the end results: differences in origin may exist. Some consideration is given to the general problem of the similarity of natural and induced mutations.

The factor *k* postulated by Watkins (cf. *PBA*, Vol. X, Abst. 273) as suppressing the speltoid condition and the gene *q* suggested by Philipstchenko for squareheadedness are concluded to be identical. The wheat classification proposed by the former author, according to a polymeric series of *K* allelomorphs controlling glume and rachis expression, is therefore regarded as invalid. The author discusses the speciation of *Triticum* on the basis of the hypothesis of interference between *Q* and many other genes. According to this hypothesis, *T. spelta* originated from the cross *T. compactum* (*T. antiquorum*) x *T. dicoccum*. Loss of *Q* does not necessarily exclude a mutant from being classified as *T. vulgare*. Speltoids of Skandia III possess a tough rachis and are classified by the author as *T. vulgare* var. *speltiforme*; speltoids of Rival, on the other hand, are characterized by a brittle rachis and classified as *T. spelta*. The decisive characteristic

separating *T. vulgare* and *T. compactum* is governed by only one factor, *C*.

1839 SIMONET, M.

Étude cytogénétique de deux céréales haploïdes. (Cytogenetic study of two haploid cereals).

CR Acad. Sci., Paris 1954 : 238 : 147-49.

In the F_1 of the cross *Aegilotriticum ventricopheevi* [*Aegilops ventricosa* ($n = 14$) x *Triticum timopheevi* ($n = 14$)] x *T. timopheevi*, a sterile plant of retarded growth with $2n = 20$ instead of 39-43 was observed. Among the progeny of the cross *T. timopheevi* x *T. persicum*, a weak and sterile haploid individual, with the characteristics of *T. persicum* only, was discovered. In both cases, the haploid plant appeared to be the result of the development of a parthenogenetic egg cell. Both plants proved almost totally asyndetic.

1840 SCHMALZ, H.

Entwicklungsphysiologische Untersuchungen am Saatweizen *Triticum aestivum* L., insbesondere über die Bedeutung der photoperiodischen Veranlagung für die Ausbildung der Sortencharaktere. (Studies in developmental physiology with bread wheat, *T. aestivum* L., particularly regarding the importance of photoperiodic constitution for the expression of varietal characters).

Kühn-Archiv 1953 : 67 : 399-400.

A fuller version of this article has already been summarized in *PBA*, Vol. XXIII, Abst. 2577.

1841 FUKASAWA, H.

(Abnormal meiosis in winter-ripened wheat).

Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 496-501. [Japanese].

In *Triticum durum* subjected to vernalization and long-day treatment, disturbances were noted in the synchronization of meiosis in the anther, and there was a tendency towards univalent formation. Fertility was lowered. Similar, but more intense, disturbances followed when the same treatment was applied to *Aegilops ovata*.

1842 OVČINNIKOV, N. N.

(Heterogeneity of pollen within a wheat spikelet).

Dokl. Akad. sel'skokochozjaistv. Nauk Lenin. (Proc. Lenin Acad. agric. Sci.) 1953 : No. 7 : 20-22. [Russian].

At Kišenev, pollen analyses were made of the central spikelets of Albidum 43 and Lutescens

329. It was found that the pollen grains taken from the secondary florets were larger than those from other florets. The spring hybrid Odessa 13 x Albidum 43 and the winter hybrid Odessa 3 x Lutescens 329 set most grain when fertilized by pollen from the secondary florets of Albidum 43 or Lutescens 329 respectively.

- 1843 DANJŠIN, T. E.
(Changing wheats by altering conditions during their vernalization phase).
 Agrobiologija (Agrobiology) 1953 : No. 6 : 119-23. [Russian].

At Vologda, heritable changes were obtained in the winter wheat Durable by sowing vernalized seed in spring in the first year and then growing the resultant elite seed upon rich soil. The material gave segregates in respect of most morphological characters. The new forms pertained to the botanical varieties *milturum*, *erythrospermum*, *lutescens* and *ferrugineum*. Some of the selected plants, notably *Milturum* 396, *Lutescens* 56 and *Ferrugineum* 74, are interesting for their resistance to rust, others for their productive ears. For instance, *Lutescens* 56 had ears 13-15 cm. long, each bearing 4 g. of grain. Similar experiments with other winter wheats, including some new varieties bred at Vologda, are in progress.

- 1844 JAKUBCINER, M. M.
(Evolution of new forms with branching ears in fields of hard wheat).
 Dokl. Akad. sel'skohozjaistv. Nauk Lenin. (Proc. Lenin Acad. agric. Sci.) 1953 : No. 1 : 43-47. [Russian].

Branching forms of hard wheat have been selected from *Triticum durum* varieties Mrari, Akmolinka 2 and Čehil Bugdai at Derbent, Dagestan, and from Hordeiforme 10 and Mestnaja K 39536 [Local K 39536] at Puškin, Leningrad province. The new forms bore larger and more vitreous grain than branching forms of *T. turgidum* and some were also earlier.

- 1845 IRVINE, G. N. & ANDERSON, J. A.
Variation in principal quality factors of durum wheats with a quality prediction test for wheat or semolina.
 Cereal Chem. 1953 : 30 : 334-42.

Varietal differences in pigment content and lipoxidase activity are tabulated. A negative correlation between the two characters is indicated.

- 1846 FREITAS, A. P. DO C. E.
 A alteração da textura do albumen no cariopse do trigo. Seu significado em melhoramento. **(Alteration of the texture of the endosperm in the wheat caryopsis. Its significance in breeding).**
 Agron. lusit. 1953 : 15 : 67-93.

Figures are given showing the percentage of vitreous grains in samples of a number of varieties of *Triticum durum* and *T. turgidum* grown under identical conditions at Sacavém, Portugal. The proportions varied from 97.0% in Argelino (*T. turgidum* var. *melanatherum*) to 25.0% in Pragana preta [Black Pragana], a form of *T. durum* var. *reichenbachii*. In most cases the volume of the vitreous grains was less than that of the starchy, and their density and hectolitre weight greater. The starchy grains absorbed water more readily and hence germinated more rapidly but the plants arising from them were less vigorous. The tendency to produce starchy grains seems to be a hereditary varietal characteristic and selection against it should be exercised in breeding operations with hard wheats.

- 1847 FAJERSSON, F.
 Öriggheten som växtodlingsproblem. **(Grittiness as a problem in crop production).**
 Agri hort. genet., Landskrona 1953 : 11 : 149-207.

The following aspects of the above problem are considered: the grittiness of flour, techniques for determining it and their reliability (cf. *PBA*, Vol. XXI, Abst. 236); the nature of grittiness in relation to the distinction between hard and soft varieties of wheat and to baking quality; and the influence of moisture, nitrogen manuring and the chemical composition of the grain upon grittiness.

An analysis of the grittiness of Swedish and other varieties of spring and winter wheats from various countries is recorded. Statistically significant differences in grittiness values obtained for the Swedish varieties, within the hard wheat group and within the soft wheat group, suggest that possibly some hereditary factor exerting a modifying effect upon the basic property of the endosperm may be involved.

Judging from breeding experiments in Sweden, a combination of good baking qualities and agronomic properties with good grittiness should not be too difficult to attain.

1848 MŁODZIANOWSKA, D.

Określenie wartości wypiekowej odmian pszenic ozimych uprawianych na terenie Polski w roku 1950. (**Determination of the baking value of winter wheat varieties cultivated in Poland in the year 1950**).

Roczn. Nauk rol. 1953 : 67 : Ser. A : 91-114.

Seventy winter wheat varieties were studied using the farinograph. Distinct varietal differences in the gluten were observed. When the various types of gluten, as deduced from the farinograms for the varieties, were divided into groups ecologically, it was found that wheats from an oceanic climate show lower mixing values, lower water absorption and shorter periods for dough ripening, than wheats from a steppe climate.

The material studied came from only eight localities, so caution is needed in interpreting the farinographic results, but the characteristics of the group of five Wysokolitewka wheats and also of the varieties Dańkowska Graniatka [Faceted Dańkowska] and Biała Krukowska [White Krukowska] were outstanding. Of the remaining varieties the best results were given by Kujawianka Więclawicka, Ostka Kazimierska Czerwonoziarnista [Red-grained Kazimierska Bearded], Antonińska Wczesna [Early Antonińska], Eka, Ostka Grubokłosa [Coarse-eared Bearded], Ostka Skomoroska [Skomoroska Bearded], Złotka, Leszczyńska Wczesna [Early Leszczyńska], Blondynka [Blonde] and Zofia.

1849 TUŠNJAKOVA, M. M.

(**The Vetvistaja Kahetinskaja wheat**). Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 60-69. [Russian].

Mention is made of breeding Vetvistaja Kahetinskaja [Branching Kahetian] in Fergana for good grain quality by crossing it with hard wheats such as Leucurum. Work is also in progress at various research institutes to obtain new productive winter wheats from crosses of Vetvistaja Kahetinskaja with soft wheats.

1850 MEDVEDEVA, G. B. & BAZAVLUK, V. JU.

(**An investigation of directed effects of embryo transplantation upon form development in hybrids**).

Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 100-05. [Russian].

Hybrids of the hard wheats Candicans 75/09 and Mutico-Valencia 89 with Kahetinskaja

Vetvistaja [Branching Kahetian] gave segregates in respect of grain characters and branching habit. Some F₂ plants bore large and vitreous grain of a quality equal or superior to that of the hard wheat parent. The percentage of plants with good quality grain increased when embryos of the hybrids were transplanted on to the endosperms of the hard wheat parent. This practice, however, reduced the percentage of plants with branching ears. Similar grafts of the hybrid endosperms on Kahetinskaja Vetvistaja increased the number of plants with branching habit, but decreased the number of plants with grain of the hard wheat type.

1851 VILMORIN, R. DE

A propos de la "force boulangère" des farines. (**Concerning the baking strength of flours**).

CR Acad. Agric. Fr. 1953 : 39 : 712-14.

Various opinions on the unsolved problem of the significance of the W value, obtained with the extensimeter or Chopin's alveograph, are reviewed. W is not directly related to the gluten or nitrogen content and good baking value determined on the basis of W does not imply good nutritive value. Protein content should, in the author's opinion, receive the attention of French plant breeders.

1852 DE MIRANDA, H. & BROEKHUIZEN, S.

Het probleem van de bakkwaliteit van inlandse tarwe. (**The problem of baking quality in home-grown wheat**).

Techn. Ber. Stichting Coörd. Cult. Onderz. Broodgraan, Wageningen 1953 : No. 6 : Pp. 20. (Mimeographed).

The question of breeding varieties combining high yield and good baking quality is discussed. Existing Netherlands varieties offer little possibility of improvement towards this end, and the introduction of foreign varieties and their use as breeding material are advocated. Data comparing the yield and baking quality of a number of important home-grown varieties are tabulated. Heine 51, Strube 4090 and Strube 5838 combine high yield and good baking quality.

1853 MCGINNIS, R. C.

Rust resistance from wild wheat relatives.

Cereal News 1952 : 1 : No. 2 : 8-10.

Species of *Agropyron*, *Haynaldia* and *Aegilops* are being tested at Winnipeg for rust reaction, especially to race 15B.

1854 RJUB, V. K.

(Changing winter wheats into spring wheats under Transural conditions).

Agrobiologija (Agrobiology) 1953 : No. 4 : 44-53. [Russian].

At Čeljabinsk, winter wheats trained for the spring habit, notably Uljjanovka, Narymčanka 1156 [Narym 1156], Taežnica 995 [Taiga 995], Alabasskaja, Ferrugineum 1479 and Hybrid 599, have given promising spring forms. They were selected on the basis of their yield, grain size and resistance to lodging, loose smut and brown rust. Some were earlier than Albidum 3700. Most of the new forms were of a different botanical variety than the initial winter wheats. For instance, Taežnica 995 (var. *erythrospermum*) gave a hard wheat of var. *hordeiforme*, and Hybrid 599 (var. *erythrospermum*) produced forms pertaining to vars. *milturum*, *ferrugineum* and *lutescens*, besides some *erythrospermum* forms. The wheat forms obtained from Hybrid 599 have productive ears of the squarehead type.

1855 SEKIZUKA, S.

(On the effect of selection in a joint application of the bulk and pedigree methods of wheat breeding).

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 233-39.

The variety Shinchucho [New Mid-long], an early scab-resistant variety, was crossed with Kinki 35 [Home District 35], which is resistant to a wilt disease referred to as green and yellow mosaic. Selection for wilt resistance was effected in the F_2 - F_4 , which were propagated as bulked populations. In the F_4 - F_8 , pedigree selection for wilt resistance and other agronomic characters was carried out, and finally, two varieties, Chugoku 79 and 80 [Central Japan 79 and 80], were isolated. These varieties are resistant to wilt and scab, have strong straw, are early, and yield well.

1856 Wintervastheid en voorjaarszaai bij wintertarwe, 1954. **(Winter hardiness and spring sowing of winter wheat, 1954).**

Landbouwvoorlichting 11 : Bijl. 13; Ber. Rassenkeuze No. 165 : 1954 : unpaginated.

The winter wheats Carsten's V, Elisabeth, Heine's VII, Mendel, Demeter and Lovink are the most winter-hardy of the varieties cultivated in the Netherlands. Data, based on trials conducted in 1953, are presented on the dates

by which the different varieties should be sown to ensure maximum grain yield.

1857 TRUHIHOVA, A. T.

(The effect of autumn environment upon changing a spring wheat into winter wheat).

Agrobiologija (Agrobiology) 1953 : No. 6 : 117-19. [Russian].

Experiments suggest that Milturum 321, whose inheritance had previously been shattered by sowing in late autumn, acquired a winter habit between 5 September, when the seed was sown in the field, and 7 December when the plants were taken into a glasshouse in which the temperature did not fall below -1°C .

1858 ÅKERMANN, Å.

Undersökningar rörande vinterhårdigheten hos svenska lantveten. **(Investigations concerning the winter hardiness of Swedish land wheats).**

Svalöf, 1949 : Pp. 12.

Past and recent research in Sweden on the winter hardiness of indigenous wheats and selections made from them at the Svalöf and Ultuna stations of the Swedish Seed Association is reviewed. The results of artificial freezing tests in 1940 and 1947 of (1) numerous land wheats of Sweden and others from various countries throughout the world, and (2) a few varieties of *Triticale* and winter oats are tabulated.

1859 CHEVALIER, R.

Échaudage du blé et poids de mille grains. **(Scorching of wheat and thousand grain weight).**

Ann. Inst. nat. Rech. agron., Paris 1953 : 3 : Sér. B. : 275-95.

The effects of scorching are discussed and varietal differences in susceptibility to intense heat and drought at the earing stage are tabulated. In trials at the Plant Breeding Station, Montpellier, France, scorching was found to be the main cause of annual fluctuations in yield.

1860 DIDUSJ, V. I.

(The winter wheat Lutescens 238).

Zemledelie (Agriculture) 1954 : No. 1 : 80-81. [Russian].

A description of Lutescens 238, obtained by single plant selection from Lutescens 17 at Harjkov, is given. It shows resistance to drought and lodging and outyields the standard Odessa 3 and other wheats. The new variety has ears 10-16 cm. long and produces large grain with good baking and milling properties.

1861 MOTRENKO, T. G.

(Descriptions of the fifth generation of spring wheats changed into winter wheats).

Agrobiologija (Agrobiology) 1953 : No. 4 : 54-66. [Russian].

At Zernovoi, spring wheats, trained for several generations for the winter habit, have given segregates belonging to other botanical varieties than the initial wheats. Promising families, some resistant to lodging, have been selected on the basis of high yield and large grain in the fifth generation. Many of them, notably some *ferrugineum* forms obtained from Albidum 43 and Pionerka [Pioneer] and *erythrospermum* material from Donskaja Garnovka, outyielded the standards.

1862 SHAH, K. S. S. M. & ABDUL JALIL

Loss caused by lodging in wheats.

Bull. Dep. Agric. NW Front. Prov.: Pp. 10.

The seven varieties investigated showed significant differences in ability to set seed after lodging and to develop the grain already set before lodging. Only Bina did not suffer from the former type of yield reduction; C-518 and C-591 were the only varieties that escaped the latter type of loss.

1863 BRUEHL, G. W.

Pythium root rot of barley and wheat.

Tech. Bull. US Dep. Agric. 1953 : No. 1084 : Pp. 24.

Varietal resistance to *Pythium* root rot is discussed after a detailed account of the disease. Thatcher, Apex and Pentad wheat appeared comparatively tolerant as did the seedlings of Solid Straw Tuscan, Surpresa, Thatcher and Premier. On infested soils, Minsturdi barley gave good tests results and Odessa and Trebi yielded more than the adapted varieties Plains and Feebar. Late varieties generally performed better than early ones though there was no definite correlation between tolerance and lateness.

1864 Winter Wheat Improvement in Ontario, Ninth Annual Report. The Winter Wheat Institute, Fourth Annual Report : 1952 : Pp. 12. (Mimeographed).

Winter Wheat Improvement in Ontario, Tenth Annual Report. The Winter Wheat Institute, Fifth Annual Report : 1953 : Pp. 24. (Mimeographed).

The results of local, semiregional and regional

cooperative tests carried out in 1951 and 1952 for yield, lodging, seed colour and resistance to rust and smut are given. Breeding in progress for resistance to rust, smut and bunt is described. Resistance to race T-16 of *Tilletia caries* is due to the same factors as resistance to dwarf bunt, so resistance to the latter can be tested by using T-16. Biscuit-making tests and chemical analysis of varieties were carried out. The white wheats Ottawa 2623 A and Genessee both gave high yields compared with the standard Cornell 595 and both were approved by the Winter Wheat Improvement Committee. Ottawa 2623 A is resistant to bunt. Fairfield was considered the best red wheat and gave the best results in biscuit-making tests.

1865 MEHTA, P. R., BABU SINGH, JAGJOT SINGH & MATHUR, S. C.

Varietal resistance of wheat to loose smut (*Ustilago tritici*).

Curr. Sci. 1954 : 23 : 20-21.

Of 22 varieties tested at the Government Research Farm at Kanpur, India, Bansi Pali 808, Bansi CP and NP 710 proved resistant to loose smut.

1866 PUGSLEY, A. T.

The resistance of White Federation 45 and Dundee 48 wheat to *Ustilago tritici* (loose smut of wheat).

J. Aust. Inst. Agric. Sci. 1953 : 19 : 238-40.

The resistant varieties White Federation 45 and 48 were crossed with the susceptible variety Ranee. F₁ and F₂ progeny showed that resistance depended on a single dominant gene.

1867 PUGSLEY, A. T.

Back-crossing of wheat for resistance to bunt in south Australia.

Emp. J. exp. Agric. 1953 : 21 : 314-20.

In breeding at the Waite Agricultural Research Institute, Adelaide University, use has been made of the tetraploid wheat Doubbi as a source of resistance to three races of *Tilletia foetida* and two races of *T. caries*. Selection RDR 6189 [(Doubbi x Ranee) x Ranee] was utilized as the nonrecurrent parent in three series of back crosses in which Insignia, Javelin and Ridley constituted the recurrent parents. Three bunt-resistant selections closely resembling the respective recurrent parents have been developed and are now being subjected to further testing. The resistance of Doubbi is apparently due to a single recessive gene *d*. Wheats carrying *M*, *H*, *T* or *d* for bunt resistance (cf. PBA, Vol. XXI, Abst. 974) exhibit different patterns of behaviour towards the five races.

Resistance of the *d* type is not infrequently expressed as a partial smutting of both ears and grains; the plants from such grain have, however, always been healthy, confirming that the parent plants were genotypically resistant.

1868 MICZYŃSKI, K.

Wrażliwość uprawianych w Polsce odmian pszenicy na śnieć *Tilletia caries* (D.C.) Tul. [**The susceptibility to bunt, *T. caries* (DC) Tul., of wheat varieties cultivated in Poland**].

Roczn. Nauk rol. 1953 : 67 : Ser. A : 69-90.

In the first series of experiments at Dublany a collection was used of 89 winter and 25 spring wheats, mostly varieties cultivated in Poland and of the species *Triticum vulgare*, except three varieties of *Triticum durum*, one of *Triticum persicum* and one of *Triticum timopheevi*; all the spring wheats and 51 of the winter varieties were studied for three years, the remaining 38 for two. The bunt samples used were obtained from two localities.

The great majority of winter wheats were highly susceptible to bunt. Outstanding resistance to infection was found in only four winter varieties, viz. Ks. Hatzfeld Hildebranda [Hildebrand's Count Hatzfeld], Biała B. Hildebranda [Hildebrand's White B.], Grubokłosa Stieglera [Stiegler's Coarse-eared] and Dickkopf Heila [Heil's Squarehead]. Some others, which had shown high, or total, resistance in the first year, but succumbed later to moderate, or severe, infection were: Sielecka Genetyczna [Genetic Sielecka], I.R. Kujawianka, Bogatka [Abundance], Hussar, Puławska Wczesna [Early Puławy] and Wysokolitewska Sobieszyńska [Tall Lithuanian Sobieszyńska].

Inoculation in the field was not satisfactory for the spring wheats, which mostly became only weakly infected; *Triticum timopheevi* showed total resistance. The Roemer-Bartholly method was then used in further experiments with 13 spring wheats and the majority were severely infected. The least susceptible variety was Hope.

Fourteen winter wheats were then inoculated with six bunt samples, two being from Dublany and the rest from four different localities in Poland. Again the same four varieties were resistant to all the bunt samples; in addition the variety Ostka Mikulicka [Mikulicka Bearded] was resistant to two samples and Hussar to one. On the basis of the reactions of these two varieties, three groups of bunt races, characterized by different degrees of virulence, may be provisionally recognized.

The winter wheat material from the first series of two and three year experiments and that from the successful infection of spring wheats was also used to study the effect of bunt infection on the rachis internode. It was found that a distinct elongation of the internode occurred after infection in almost all the winter varieties, whether of the lax or dense eared type, but the effect was especially pronounced in varieties with dense ears. In the spring wheats, all lax eared types, infection caused no noteworthy change in the ear structure; in only two spring varieties did the elongation exceed 0.5 mm.

1869 SIBILIA, C.

Le razze di *Puccinia triticina* in Italia ed in Europa. (**The races of *P. triticina* in Italy and in Europe**).

Boll. Staz. Pat. veg. Roma 1952 : 10 : 203-12.

So far 22 races have been identified in Italy, 14 of which were new at the time of their detection. A table is given showing their distribution and another table gives a list of the races known to be present in each of the main countries of Europe.

1870 URRÍES, M. J. & SALAZAR, J.

La especialización fisiológica de *Puccinia graminis* f. sp. *tritici* Eriks. et Henn. y *Puccinia rubigo-vera*, f. sp. *tritici* (Eriks.) Carl., en España, en 1952-1953. [**Physiological specialization of *P. graminis* f. sp. *tritici* Eriks. et Henn. and *P. rubigo-vera* f. sp. *tritici* (Eriks.) Carl. in Spain in 1952-53**].

Bol. Inst. Invest. agron., Madr. 1953 : 13 : 423-30.

The same races as those reported in earlier contributions (cf. *PBA*, Vol. XXIII, Abst. 1886) were found in *P. graminis*. Many samples of *P. rubigo-vera*, on the other hand, conformed to no race hitherto described; two of them proved capable of attacking Malakoff. Races 45, 57, 67, 87 and 105 were recorded in Spain for the first time.

1871 STAKMAN, E. C., LOEGERING, W. Q., HARRAR, J. G. & BORLAUG, N. E.

Razas fisiológicas de *Puccinia graminis tritici* en México. (**Physiological races of *P. graminis tritici* in Mexico**).

Foll. téc. Secretaría Agric. Ganad., México 1950 : No. 3 : Pp. 19.

The races prevalent in the north of Mexico are roughly the same as those in the USA, and in Central Mexico several races formerly absent have begun to appear. This makes it necessary to breed for resistance to virulent races such as 15B and possibly even 189.

- 1872 JOHNSTON, C. O. & LEVINE, M. N.
Physiologic races of the leaf rust of wheat in the United States in 1952.
 Plant Dis. Repr. 1953 : 37 : 438-39.
 (Mimeographed).

Information on the distribution of races of *Puccinia rubigo-vera* var. *tritici* during 1952, as indicated by an analysis of 213 collections from 28 states, is provided. Twenty-six races were identified but many of these only occurred sporadically. Race 5, representing 21.1% of all the isolates, was the most prevalent.

- 1873 AYAD, M. A. G. [AYAD, M. 'A.UL G.]
Inheritance of reaction to stem rust in crosses between Egyptian varieties of wheat.

Proc. Egypt. Acad. Sci. 1952 : 8 : 1-11.

The seedling reactions of Hindi 62, Hindi Immune, Giza 139, Cross 951A and the F_3 progeny of Hindi 62 x Hindi Immune, Giza 139 x Hindi 62, Hindi Immune x Giza 139 and Cross 951A x Hindi Immune to races 17, 21 and 38 of *Puccinia graminis tritici* were studied at Alexandria University. The first-mentioned parent was susceptible to all three races and the last three were resistant. The F_3 progeny of the above crosses showed that resistance to all three races in Hindi 62 x Hindi Immune and to races 17 and 21 in Giza 139 x Hindi 62 was dominant and monogenic. Resistance to race 38 in the latter cross was dominant and governed by two factors, either of which gives resistance alone, one of them also being responsible for resistance to races 17 and 21. Crosses between the resistant parents gave resistant F_3 progeny showing no segregation for resistance to the different races, thus indicating, together with the above results, that the factors responsible for resistance are identical in all three cases.

- 1874 **New wheats resistant to 15B rust.**

Seed World 1953 : 73 : No. 12 : p. 39.

The Canadian variety CT186 and the variety developed by the North Dakota Agricultural College, Ns 3880, both show resistance to race 15B of stem rust. The former averaged 32.5 bushels per acre in 1953 and the latter 27.8 bushels.

- 1875 HEYNE, E. G. & JOHNSTON, C. O.
Inheritance of leaf rust reaction and other characters in crosses among Timstein, Pawnee and RedChief wheats.

Agron. J. 1954 : 46 : 81-85.

The spring wheat Timstein was found to possess adult-plant resistance to the leaf-rust races commonly occurring in Kansas, whereas the

winter wheats Pawnee and RedChief were susceptible. In the seedling stage Timstein was resistant to races 5, 9, 15, 44 and 46, Pawnee to race 9. RedChief proved susceptible to all five races. The data from crosses revealed that Timstein carried a recessive factor and one or more modifiers for adult resistance. The seedling resistance of Pawnee to race 9 was due to a major factor, at least partially epistatic to a recessive gene from Timstein for seedling resistance to all five races; in addition, Timstein possessed one or more modifiers which reduced seedling resistance. The Pawnee factor for seedling resistance to race 9 was associated with the Timstein factor for adult plant resistance to stem rust, with a recombination value of $21.7 \pm 7.8\%$; according to the literature these factors are situated on chromosome X. Neither of these factors was associated with those for awn development and seed colour. In the crosses Pawnee x Timstein and RedChief x Timstein, the seedling resistance of Timstein to different races of leaf rust was associated with its field reaction to this disease, but not with reaction to stem rust or winter injury. Timstein possessed at least one major factor for field resistance to stem rust. With respect to seed colour, the genotypes of Timstein, Pawnee and RedChief were $r_1r_1r_2r_2r_3r_3$, $R_1R_1r_2r_2r_3r_3$ and $r_1r_1R_2R_2R_3R_3$, respectively, the grain colour of Timstein being white and that of the other two red. Pawnee differed from Timstein and RedChief by a major factor for awn development. Winter-hardy hybrid lines have been developed which, under conditions in Kansas, are resistant to leaf rust in the seedling and adult stages, and also resistant to the common races of stem rust, except 15B.

- 1876 MOTWANI, V. T.

Rust-resistant wheat varieties for Saurashtra.

Indian Fmg 1953 : 3 : No. 9 : 21, 32.

Trials in different parts of Saurashtra have shown that the awned varieties NP 710, 715 and 760 and the awnless varieties NP 797 and 798 are higher yielding, have a better quality grain and are more resistant to rust than the locally grown variety Lal katha. NP 797 and 798 also mature earlier and so save one irrigation.

- 1877 MAMONTOVA, A. N.

(The resistance of wheat to brown rust).

Agrobiologija (Agrobiology) 1953 : No. 6 : 29-39. [Russian].

A rust strain living upon a variety of wheat for several generations becomes adapted to

varieties genetically similar to the host. To maintain resistance, a new variety must be isolated from all related forms susceptible to the local rust strain. Rust-resistant wheats unrelated to susceptible local varieties are regarded as the best breeding material.

1878 ŠULYNDIN., A. F.

(A winter wheat, resistant to brown rust, obtained by sowing in late autumn).

Agrobiologija (Agrobiology) 1953 : No. 4 : 129-31. [Russian].

At Har'kov, the winter wheats *Lutescens* 17, *Odessa* 3 and *Ukrainka*, trained for hardiness, have given segregates interesting for their high yield and resistance to pests and diseases. *Ferrugineum* 510, selected from the segregates given by *Lutescens* 17, is described. It is resistant to lodging and *Puccinia triticina* and has a 1000 grain weight higher than that of the standard.

1879 LOVČIKOV, I.

(New standard varieties of hard wheat).

Zemledelie (Agriculture) 1954 : No. 1 : 82-85. [Russian].

Narodnaja [Popular], originating at Har'kov, surpassed *Melanopus* 69 in yield, grain quality and drought resistance in recent trials. In *Baškiria*, it was earlier and more productive than the former standard *Hordeiforme* 10. *Akmolinka* 5, recently developed at *Šortanda*, has done well in *Kazah* trials. It shows resistance to rust, spring frost and drought, out-yields *Hordeiforme* 10 and is superior to it in resistance to shedding and lodging. Its grain is larger and of better baking quality.

1880 Food production and plant breeding.

Proc. Nairobi sci. phil. Soc. 1952 : 6 : Pt. 1 : 5-16. (Mimeographed).

A short account of the part played by plant breeding towards increasing the world's food supply is given. Breeding rust-resistant wheat in Kenya is briefly described.

1881 RUPERT, J. A.

Resistencia al chahuixtle como factor en el mejoramiento del trigo en México. (Rust resistance as a factor in wheat breeding in Mexico).

Foll. téc. Secretaría Agric. Ganad., México 1951 : No. 7 : Pp. 42.

An analysis is presented of the climatic conditions in the four main wheat-growing zones of Mexico, the varieties available for growing there, and the requirements in breeding new ones. A programme of testing the value of local

and introduced varieties and of hybridization was initiated in 1944 by the Mexican ministry of agriculture in conjunction with the Rockefeller Foundation. Two generations a year are obtained by growing in the central plateau and in the plains; in the case of specially valuable crosses three generations are obtained, two in the greenhouse and one out of doors. Testing is carried out in each of the four zones.

Some 8000 selections were made from the mixed populations growing in the fields; of the bread wheats, all but two were destroyed by rust. These two, I-421-1 and I-421-8, were relatively resistant to *Puccinia graminis* and *P. glumarum* but were late and susceptible to *P. triticina* and to lodging. Of the commercial varieties, *Mentana* displayed a certain resistance to *P. triticina*, and *Marroquí*, *Aguilera* and *Mentana* were resistant to *P. glumarum*; some of the spring wheats from Canada and the USA possessed resistance to *P. graminis* but were mostly too late in maturity owing to the short days. *Timstein* and some other Australian wheats were more suitable in this respect. Resistance to *P. triticina* was found in the Brazilian wheats *Fronteira*, *Frontana* and *Fronrosa*, in some Australian varieties, and in *Supremo*, selected in Mexico from material of the cross *Supresa* x (*Hope-Mediterranean*) obtained from Texas. Some F_1 lines of this cross combined resistance to the three rust species and to lodging, and from them the line that gave rise to the spring wheat *Supremo* was selected. It is somewhat prone to shedding and is not suitable for hot dry regions but in others it has given yield excesses of up to 139% over *Marroquí* in years of bad rust epidemics. *Rocamex* 324 is a spring wheat selected from hybrid material from Kenya; it is highly resistant to stem rust but though susceptible to the other two rust species it is recommended for areas of mechanized harvesting on account of its freedom from lodging and shedding.

In the crossing programme, designed primarily to produce early wheats resistant to *P. graminis* and adapted to local conditions, the varieties *Newthatch* and *Kenya* 324 showed the best combining ability with Mexican wheats. Five new hybrids produced from the first series of crosses exceed the local wheats by 10-20% under conditions free from rust and by up to 277% in seasons of rust epidemics, where their yield is scarcely diminished at all. The best hybrids have been from *Newthatch* x *Marroquí* and *Kenya* 324 x *Mentana* and they have been back-crossed with their respective parents. The back-crosses (*Marroquí* x *Newthatch*) x

Newthatch and (Kenya 324 x Mentana) x Mentana have shown a superiority of some 30% and 25% respectively over the original hybrids, and 34–39% over Supremo. They are, however, still susceptible to *P. triticina*; a hybrid of Supremo x Perú combines resistance to all three rust species with lodging resistance and its back cross with Perú is being used extensively in multiple crosses; one of these, Yaqui 48 x [(Perú-Supremo) x Perú] x Yaqui, combines resistance to all three rusts with short, erect straw and early maturity. A list is given of a number of double crosses that have produced hybrids possessing resistance to the three rusts combined with promising agronomic features. Supremo, Kenya 324, Newthatch and Timstein supply resistance to the main races of stem rust present, namely 17, 19, 38, 56 and 59; and Egypt 101, some of the Kenya wheats, Timstein and Frontana are used as sources of resistance to race 15B. The genes of Frontana, Timstein, Perú and Montana are used to supplement the resistance of Supremo to *P. triticina*. It is calculated that at least 40,000 ha. of land otherwise unsuitable will be made available for wheat cultivation by the use of the new hybrids for summer sowing in the wet season; and in other areas the yields will be materially increased by the possibility of making freer use of irrigation and fertilizers.

1882 BUJANOV, M. F.

(Improving the hardiness of branching wheat).

Agrobiologija (Agrobiology) 1953 : No. 6 : 40–46. [Russian].

Some winter forms, interesting for their resistance to rust and lodging, have been selected from the spring wheat Kahetinskaja Vetrivstaja [Branching Kahetian] trained for winter habit in the Stavropolj territory.

1883 EARTHART, R. W.

Reaction of wheat varieties to *Septoria nodorum* in Florida.

Plant Dis. Repr. 1953 : 37 : 436–37. (Mimeographed).

Tabulated data on the reaction of varieties and hybrid selections to *S. nodorum* during the season 1952–53 are given.

1884 BOCKMANN, H.

Untersuchungen über die Anfälligkeit verschiedener Weizensorten gegen die Halmbruchkrankheit des Getreides. (Investigations of the susceptibility of different wheat varieties to the eyespot disease of cereals).

Z. Pflanz. 1953 : 32 : 361–72.

Varietal differences in resistance to *Cercospora*

herpotrichoides were noted over a three-year period. Derenburger Silberweizen [Derenburg Silver wheat] and Svalöfs Scandia were the most consistently resistant of the 17 varieties tested. In most varieties, a natural tendency to lodging was highly correlated with susceptibility to the fungus. Susceptibility to *C. herpotrichoides* does not decrease yield significantly, as the infected plant tends to manifest a denser growth.

1885 MCKINNEY, H. H.

Virus diseases of cereal crops.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 350–60.

Varieties resistant to rosette mosaic virus of wheat and soil-borne oat mosaic virus are mentioned.

1886 Zomertarwe, 1954. (Spring wheat, 1954).

Landbouwwoorlichting 11 : Bijl. 1; Ber. Rassenkeuze No. 153 : 1954 : unpaginated.

In trials conducted in the Netherlands, Peko gave the highest yield of grain on all types of soil and also the highest average yield of straw of the five spring wheats tested, though all were outyielded by winter wheats.

1887 Résultats obtenus à la ferme expérimentale de Fès dans des essais culturaux combinés de variétés, d'époque et de densité de semis de blés tendres. (Results obtained at the Fez Experimental Farm in combined planting trials of varieties and time and density of sowing of soft wheats).

Terre Maroc. 1952 : No. 275 : Pp. 7.

Under the climatic conditions prevailing at Fez, French Morocco, the varieties 2511 Cailloux Tunisie [2511 Pebbles Tunisia], 335 Cadet and 982 Baroota Wonder proved the most productive.

BUCKWHEAT

1888 TATEBE, T.

(Physiological studies on fertility in buckwheat. On self-fertile, long-styled individuals).

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 240–44. [Japanese].

Some self-fertile, long-styled plants were detected among Japanese buckwheat populations; they were characterized by having up to 100% large pollen grains in the anthers in contrast to the small grains normally found in long-styled plants. The self fertility was inherited.

- 1889 ELAGIN, I. N.
(**The production of hybrid buckwheat seed**).

Dokl. Akad. sel'skhozjaistv. Nauk Lenin. (Proc. Lenin Acad. agric. Sci.) 1953 : No. 4 : 11-15. [Russian].

This article has already been summarized in *PBA*, Vol. XXIII, Abst. 260.

OATS

- 1890 ÅKERMANN, Å.
Svalöfs havresorter i in- och utlandet.
(**Svalöf varieties of oats at home and abroad**).
Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 4-6.

The characteristics and performance of some of the newer white and black varieties of oats bred at Svalöf are compared, with special reference to yield, strength of straw, seed quality and reaction to heavy nitrogen manuring. Sol II [Sun II] and Blenda, though outstanding in adaptation to modern methods of harvesting, could still be improved in this respect. Maximum bushel weight and crude protein content, as well as low husk percentage are also important aims in breeding, especially in the case of grey oats, which are inferior in quality to white.

- 1891 MURPHY, H. C.
Registration of oat varieties, XVIII.
Agron. J. 1953 : 45 : 568-70.

In 1953 the following varieties were approved for registration in the United States: Craig (cf. *PBA*, Vol. XXII, Abst. 313); LeConte (cf. *PBA*, Vol. XXI, Abst. 2467); Mohawk; Southland (cf. *PBA*, Vol. XXI, Abst. 263); and Taggart (cf. *PBA*, Vol. XIX, Abst. 1751). Mohawk [Bond x Iowa D 67 (Richland x Green Russian)] is an early, stiff-strawed and medium tall variety, closely resembling Clinton in appearance, performance and disease resistance. It is highly resistant to 89 of the 113 races of crown rust but highly susceptible to the newer races. It is resistant to *Helminthosporium victoriae* and has the White Tartar type of resistance to stem-rust races 1, 2, 5, 8, 9 and 10.

- 1892 HEADY, E. O. & SCHOLL, J. M.
Pasture improvement costs and returns.
Iowa Fm Sci. 1953 : 8 : No. 6 : 9-12.

Another account of Clintland oat is given. It is compared with Clinton and Clintafe and the

trial performances of these three varieties are tabulated (cf. Abst. 273).

- 1893 FREY, K. J.
Artificially induced mutations in oats.

Agron. J. 1954 : 46 : p. 49.

Huron was treated with X rays at the Iowa Agricultural Experiment Station and the following mutants of agronomic value were obtained: (1) shorter and stiffer straw; (2) earlier maturity by 4-6 days; and (3) "field tolerance" to crown rust and resistance to stem rust apparently caused by race 7.

- 1894 SMIRNOV, B. M.
(**Conversions of oats into *Avena fatua* and of *A. fatua* into oats**).
Agrobiologija (Agrobiology) 1953 : No. 4 : 38-43. [Russian].

At Saratov, conversions of the oat Pobeda [Victory] into *A. fatua* var. *vilis* and of the latter into oats or another variety of *A. fatua* have been noted, and are ascribed to such external conditions as sowing time and state of cultivation of the soil.

- 1895 OINUMA, T.
(**Caryomorphology of cereals. X. Caryotype diversity in *Avena*, *Agropyron* and *Bromus***).

Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 467-74. [Japanese].

The following information on chromosome number and morphology is presented: *Avena strigosa*, $2n = 14$ ($2b_1$); *A. barbata*, $2n = 28$ ($4b_1$); *A. byzantina*, $2n = 42$ ($6b_2$); *A. fatua*, $2n = 42$ ($6b_2$); *A. sativa*, ($4b_1 2b_2$); *Agropyron semicostatum*, $2n = 42$ ($4a_1 2a_2 4b_1 2b_2$); and *B. unioides*, $2n = 42$ ($4a_1 2a_2 4c_1 2c_2$). These data suggest that *Avena sativa*, *Agropyron semicostatum* and *B. unioides* are allopolyploids.

- 1896 **The case of the disappearing chromosomes.**

Discovery 1954 : 15 : 2-4.

P. T. Thomas at Aberystwyth has found that when the hybrids produced by crossing *Avena sativa* and *A. byzantina* ($2n = 42$ in each case) were self pollinated a few dwarf plants were produced with only 40 chromosomes. Chromosome elimination was observed during the formation of the F_1 tapetal cells and in the F_2 embryo just before dormancy. It is suggested that the loss of the chromosomes may be due to a recessive factor. Pollen mother cells in the dwarf plants contained 40, 41 or 42 chromosomes.

- 1897 HUTCHINSON, J. B., KENT, N. L. & MARTIN, H. F.

The kernel content of oats. Comparisons of kernel content and thousand kernel weight for winter and spring varieties.

J. nat. Inst. agric. Bot. 1953 : 6 : 443-53.

The average kernel content, kernel weight and husk weight of 20 varieties of oats are compared. Considerable interaction between environment and variety was noted. Grey Winter and Picton had the highest kernel content and Picton and Marvellous the largest grain.

- 1898 Haver, 1954. (Oats, 1954).

Landbouwwoorlichting 11 : Bijl. 3; Ber. Rassenkeuze No. 155 : 1954 : unpaginated.

Data are presented on the yield, grain quality, length and stiffness of straw and soil requirements of the principal varieties cultivated in the Netherlands. Civena, Abed Minor and Pendek were among the most productive varieties.

- 1899 NAKAO, S.

On the Mongolian naked oats, with special reference to their origins.

Sci. Rep. Fac. Agric. Naniwa Univ. 1950 : 7-24.

On the basis of observations on naked oats cultivated in southern Mongolia and on the characteristics shown by a sample when grown at the Kihara Institute for Biological Research, Kyoto, Japan, the author classifies the Mongolian oats into six varieties. One variety, having a brittle rachis, belongs to *Avena fatua* subsp. *septrionalis*; the other five, with a tough rachis, are representatives of *A. fatua* subsp. *nodipilosa*. Vars. *decorticata* and *mongolica* are naked, whereas the remaining four, vars. *kiharae* (subsp. *septrionalis*), *subglabra*, *imanishii* and *chaharensis*, are hulled types occurring as admixtures with the naked oats. Four of the varieties of subsp. *nodipilosa* are subdivided into forms. Reference to oat cultivation in the Chinese classics and available information on the geographical distribution of oat growing in north-eastern Asia in modern times are discussed. The conclusion is reached that the Mongolian naked type evolved in north-eastern Asia from the brittle wild form of subsp. *septrionalis*, passing through an intermediate stage as a hulled cultivated form of subsp. *nodipilosa*.

- 1900 WELSH, J. N. ET AL.

Oat varieties—past and present.

Publ. Canad. Dep. Agric. 1953 : No. 891 : Pp. 51.

The reactions of approximately 90 varieties of

oat to *Puccinia graminis* var. *avenae*, *P. coronata* var. *avenae*, *Ustilago kolleri*, *U. avenae*, *Pseudomonas coronafaciens*, *Ps. striafaciens*, *Fusarium* root rot, *Helminthosporium victoriae* and *Erysiphe graminis* are given. Information on the chemical composition of 60 varieties and species is tabulated and brief mention is made of the history, general characteristics, disease resistance and nutritive value of 86 varieties.

- 1901 **Sunland and Seminole, new Florida oats, yield well alongside standard varieties.**

What's New Crops Soils 1953 : 6 : No. 3 : p. 21.

Two new oat varieties have been released by the Florida Agricultural Experiment Station. Sunland (Landhafer x Fulghum CI 708) is tall, early, and resistant to crown rust but susceptible to stem rust and Florida smut collections. Seminole is short, early, inherits resistance to crown rust from Santa Fe, and is resistant to Florida smut collections but susceptible to stem rust.

- 1902 SCHAFTER, J. F., CALDWELL, R. M., COMPTON, L. E. & PATTERSON, F. L.

Reaction of oats varieties and selections to powdery mildew at Lafayette, Indiana.

Plant Dis. Repr. 1953 : 37 : 306-09.

Tables are given summarizing the results of a test of the reaction of spring and winter oat varieties and hybrid selections to *Erysiphe graminis* var. *avenae* under greenhouse conditions at Purdue University Agricultural Experiment Station, Lafayette, Ind.

- 1903 POPP, W. & CHEREWICK, W. J.

An improved method of inoculating seed of oats and barley with smut.

Phytopathology 1953 : 43 : 697-99.

A method of inoculating barley and oat seed with smut spores by use of a high speed electric homogenizer is described. It is useful when a large number of seed lots and varieties are to be inoculated.

- 1904 ROTHMAN, P. & FREY, K. J.

Effect of stem rust on yield, test weight, and maturity of oats.

Plant Dis. Repr. 1953 : 37 : 302-05.

In experiments at the Michigan Agricultural Experiment Station, an epiphytotic of races 2 and 8 of *Puccinia graminis* var. *avenae* caused a 25% reduction in yield, an 8% reduction in test weight and a two-day delay in heading in susceptible F₃ and F₄ strains from the cross Wolverine x Hajira-Joanette, in comparison with resistant counterparts from the same cross.

- 1905 BROWN, A. R. & MILLER, J. H.
A comparative study of *Helminthosporium sativum* Pam., King and Bakke and *H. victoriae* Meehan and Murphy on oats.
 Agron. J. 1954 : 46 : 63-67.

Differences of opinion exist concerning the specific identities of *H. sativum* and *H. victoriae*. In addition to *H. avenae*, the authors have observed two further species in Georgia, classifying them as *H. victoriae* and *H. sativum*. The Georgia form of the latter, however, differs from the type culture from Minnesota in both spore characters and disease symptoms; possibly more than one species has been involved in the complex named *H. sativum*. Isolates of *H. victoriae* from Georgia and Minnesota were strongly parasitic on oats of Victoria parentage but very weakly or not at all pathogenic on Bond and Red Rustproof derivatives. Isolates of *H. sativum* produced symptoms on all the oat varieties studied and on Trebi barley. Spore characters were unaffected by the host variety. Symptoms and spore morphology remained constant throughout two parasitic generations.

- 1906 TVEIT, M. T.
Physiological specialization in *Helminthosporium victoriae* (Meehan and Murphy).
 Acta agric. Scand. 1954 : 4 : 63-66.

From oat seed of Brazilian origin at the University of Minnesota, 56 isolates of *Helminthosporium victoriae* were obtained. According to pathogenicity, which ranged from mild to virulent, there were at least 5 physiological races. Some isolates attacked varieties other than those of Victoria origin.

- 1907 WELSH, J. N., PETURSON, B. & MACHACEK, J. E.
Associated inheritance of reaction to races of crown rust, *Puccinia coronata avenae* Erikss., and to Victoria blight, *Helminthosporium victoriae* M. and M., in oats.
 Canad. J. Bot. 1954 : 32 : 55-68.

Garry, RL 1987, Roxton, Exeter, Garry x Exeter, Garry x Roxton and Roxton x RL 1987 were used in this study. Resistance to Victoria blight was found to be recessive and monogenic. Resistance to races 4, 5, 34 A and 57 of crown rust was dominant and monogenic and linked with susceptibility to Victoria blight. Three genes, one of which was linked with susceptibility to Victoria blight, governed resistance to the other races which all reacted

in the same way as race 45. Lines were obtained resistant to both Victoria blight and all races of crown rust except 4, 5, 34A and 57.

- 1908 Notes from Bush—VII.
 Scot. Agric. 1953-54 : 33 : 164-65.

In the oat trials of 1952, Sun II, Blenda and Minor yielded most grain. Minor ripens 3 or 4 days earlier and has equally strong or stronger straw than the other two. Two trials of different varieties of spring barley were conducted. In one, Drost and Rika gave the highest yield, and in the other Ymer and Nordgaarden 56. Nordgaarden 56 ripens earlier than Ymer and has stronger straw.

- 1909 KELLY, A. F.
Spring oat variety trials 1945-1952.
 J. nat. Inst. agric. Bot. 1953 : 6 : 396-431.

Trials of 21 varieties of spring oats at a total of 30 centres throughout Britain are reported, together with comprehensive data on tillering, length of straw, grain characteristics and percentage husk content of grain, maturity and resistance to disease. Aberystwyth 01747/6/7, from the cross (Victory x Red Algerian) x (Red Rustproof x Record) proved resistant to mildew, and gave high yields in comparisons where the disease was prevalent. Sun II, Opus, Glasnevin Triumph and Blenda also gave high yields.

- 1910 RICHARDSON, D. E. & ROBINSON, D. H.
Joint N.A.A.S./N.I.A.B. trials of spring oat varieties, 1949-51.
 J. nat. Inst. agric. Bot. 1953 : 6 : 432-42.

Particulars of a large number of trials throughout England and Wales during 1949-51 are given, with data on maturity, straw length, and resistance to lodging, diseases and pests. Little difference in yield was established between the main varieties tested, Sun II, Eagle, Star, Opus and Maldwyn. Milford displayed the best resistance to lodging, but gave a comparatively low yield.

- 1911 Varieties of winter oats and winter barleys. Recommended lists for 1954.
 Fmrs' Leaflet. nat. Inst. agric. Bot. 1954 : No. 9 : Pp. 3.

Oat varieties recommended for general use in Britain are Picton, S 147 and S 172, whilst Grey Winter has more limited use. Pioneer is the winter barley variety recommended. Brief notes on these varieties are given. Grey Winter is to be withdrawn from the list in 1955.

1912 Varieties of spring oats. Recommended list for 1954.

Fmrs' Leaflet. nat. Inst. agric. Bot. 1954 : No. 13 : Pp. 4.

Varieties recommended for general and limited use in Britain are mentioned with brief notes. Early Miller, Onward, Star, Supreme and S 84 are to be withdrawn from the list in 1955. Opus has been added to those varieties provisionally recommended.

1913 NICHOLSON, G.**Oat and barley varieties recommended for 1954 sowings.**

Agric. Gaz. NSW 1953 : 64 : 637-40.

Oat and barley varieties are recommended for New South Wales. Oat varieties are recommended on a regional basis with an accompanying map, and brief notes on each variety are given.

RYE**1914 PESOLA, V. A.**

Syysrukiin jalostustyöstä ja lajikekoetöiminnasta Maatalouskoelaitoksen Kasvinjalostusosastolla. (Breeding work and varietal experiments on autumn rye and the Plant Breeding Section of the Agricultural Experiment Station).

Valt. Maatalousk. Julk. 1953 : No. 138 : Pp. 42.

Extensive trials at Jokioinen during the years 1918-51 are described and comparative data for a large number of native and imported strains are given, dealing with yield, winter hardiness and strength of straw. The four leading varieties released during this period are Ensi [First], Toivo [Hope], which was used as a standard in the experiments, Pekka and Onni [Fortune]. Of these, Pekka and Onni are the highest yielding, and have a somewhat stiffer straw than Toivo, while Ensi has the greatest winter hardiness. Breeding work is still in progress, and methods involving polycrossing and polyploidy are being utilized.

1915 Adams rye is released.

What's New Crops Soils 1953 : 6 : No. 3 : p. 23.

The new winter variety, Adams, has been developed by Wisconsin University for local conditions. It is similar to Imperial but gives a slightly higher yield.

1916 New rye being increased.

What's New Crops Soils 1953 : 6 : No. 3 : p. 23.

The new variety, Caribou, made available by

the University of Minnesota, is reported to be superior to Emerald and Imperial in yield, winter hardiness and weight.

1917 NAKAJIMA, G.

[Cytogenetical studies on intergeneric hybrids between *Haynaldia* and *Secale*. I. Morphology and meiosis in the pollen mother cells of an F_1 plant of *H. villosa* ($n = 7$) \times *S. cereale* ($n = 7$)].

Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 364-69. [Japanese].

One F_1 plant was obtained out of 2681 pollinations in the above cross. The hybrid had $2n = 14$ chromosomes; there were usually 14 univalents at meiosis but 1-2 allosyndetic bivalents were sometimes formed. A few F_2 plants were raised from selfing the F_1 and by back-crossing to *S. cereale*.

1918 STEBBINS, G. L. (JUN.) & FUNG TING PUN

Artificial and natural hybrids in the Gramineae, tribe Hordeae. VI. Chromosome pairing in *Secale cereale* \times *Agropyron intermedium* and the problem of genome homologies in the Triticinae.

Genetics 1953 : 38 : 600-08.

F_1 hybrids between *S. cereale* and *A. intermedium* resembled the latter parent morphologically and were completely sterile. Bivalent formation during meiosis was chiefly due to autosyndesis of chromosomes derived from *Agropyron*. The chromosomes of *Agropyron* could be identified by their smaller size compared with those of rye. The seven chromosomes of rye usually appeared as univalents. Among the *Agropyron* chromosomes the most frequent configurations were $I_7 + II_7$, $I_6 + II_6 + III_1$ and $I_8 + II_5 + III_1$. The view is expressed that previous investigators of hybrids of *A. intermedium* (= *A. glaucum*) or *A. trichophorum* with *Triticum* spp. have underestimated the amount of autosyndesis possible within the haploid complement of these two *Agropyron* species. Revisions of the genome formulae of some *Agropyron* spp. are suggested. For decaploid *A. elongatum*, $B_2E_1E_2F_1F_2$ is thought to be more suitable than the formulae previously proposed. The diploid species possessing some of these genomes are postulated. It is emphasized that no sharp distinction can be made between those species of *Agropyron* closely related to *Triticum* and those which are not.

1919 NAKAJIMA, G.

(The chromosomes in 3 species of *Secale*).

Ikushugaku Zasshi/Jap. J. Breeding
1953 : 2 : 201-04. [Japanese].

In *S. africanum*, *S. montanum* and *S. vavilovii*, $2n = 14$. Metaphase configurations of the three species are illustrated. In *S. vavilovii*, a pair of univalents occurred fairly frequently.

1920 HAGBERG, A.

Frekvensen av plantor med avvikande kromosomtal i marknadspartier av tetraploid råg (Dubbelstålråg). [The frequency of plants with aberrant chromosome numbers in commercial lots of tetraploid rye (Dubbelstålråg)].

K. LandtbrAkad. 1953 : 92 : 417-27.

Examination of 1043 seedlings raised from nine different lots of commercial Dubbelstål [Double Steel] and mainly from seed below average size, provided no evidence of reversion to diploidy in these populations.

The frequency of aneuploids, recorded as 22.7% 10 generations earlier (cf. *PBA*, Vol. XIII, Abst. 500 and Vol. XXI, Abst. 1804), had fallen to 14.5% owing to a decrease in the number of forms with $2n > 28$ to 6.7% from 15.0%. The frequency of forms with $2n < 28$ was unchanged at 7.8%.

From an analysis of the individual seed samples into four groups, based on seed size and on the distribution of $2n > 28$ forms and of $2n < 28$ forms within the groups, it appears that the number of $2n < 28$ plants in tetraploid varieties could be reduced simply by sieving; and diploids would also be automatically excluded. In producing foundation seed, however, chromosome determinations would be essential.

1921 TJIO, J. H., SÁNCHEZ-MONGE PARELLADA,

E. & ALVAREZ PEÑA, M.

Centenos tetraploides españoles.

(Spanish tetraploid ryes).

Agricultura, Madr. 1954 : 22 : 138-40.

Tetraploid ryes obtained from Sweden, Denmark and the Netherlands have proved unsuitable for cultivation in Spain and samples of rye from different parts of Spain were treated with colchicine, leading to the production of 156 tetraploid plants with $2n = 28$. They were similar to the parental forms in time of maturity and their pollen fertility varied from 90 to 100%; the 1000 grain weight exceeded 45 g. in many of the plants and reached 66.24 g. in some, compared with 25.67-29.59 g. in the original diploids. The best plants in respect of resistance, vigour and fertility have been

selected and are being tested for yield with the object of producing a good synthetic.

1922 PLARRE, W.

Vergleichende Untersuchungen an diploidem und tetraploidem Roggen unter besonderer Berücksichtigung von Inzuchterscheinungen und Fertilitätsstörungen. **(Comparative investigations of diploid and tetraploid rye with special reference to manifestations of inbreeding and to disturbances in fertility).**

Kühn-Archiv 1953 : 67 : 398-99.

The 1000-grain weight of tetraploid Petkus rye was 45-50% higher, the length of the culm 11-15% less, the number of fertile flowers 8-10% less, the pollen sterility slightly greater and the protein content of the grain 2.9-3.6% higher than in diploid Petkus. The tetraploid variety proved slightly more self compatible. Disturbances at meiosis were more frequent than in the diploid and 20-25% fewer grains were formed.

1923 BREMER, G. & BREMER-REINDERS, D. E. **Breeding of tetraploid rye in the Netherlands. I. Methods and cytological investigations.**

Euphytica, Wageningen 1954 : 3 : 49-63.

Studies of colchicine-induced tetraploid rye carried out during the period 1946-1952 at the Institute of Agricultural Plant Breeding, Wageningen, are surveyed. Selection of tetraploid Petkus rye was initiated in 1947 using 49 C_1 plants. Investigations on the frequency of euploids and aneuploids, on the origin of rare sterile plants, and on meiosis in pollen mother-cells in succeeding generations are described in detail. Selection for seed setting resulted in an increase from 60% or less in 1947 to about 75% or more in 1953. The frequency of aneuploids decreased in later generations and meiosis became more regular. The marked improvement in seed setting is therefore attributed to increased meiotic regularity in the individuals selected visually for fertility.

1924 PUTT, E. D.

Cytogenetic studies of sterility in rye.

Canad. J. agric. Sci. 1954 : 34 : 81-119.

At the Morden Experiment Station, Man., detailed studies of ten lines which had been inbred for 3 to 13 generations indicated that the lines were highly variable with respect to pollen abortion, even lines selfed for 12 to 13 generations being heterozygous for this character. The selfed lines were also highly variable for seed set, although the variability was not as

marked as for pollen abortion. No significant correlation between pollen abortion and seed set was obtained. Cytological abnormalities in the microsporocytes included univalents, sticky chromosomes, inversions, long chromosomes, stretched rod bivalents and a translocation. No consistent relationship was detected between the cytological aberrations and pollen abortion or seed set. Only one line, CP 11, was fairly uniform cytologically, showing long chromosomes in all the plants examined. Further investigations were carried out on two selfed and three open-pollinated families developed from the F_1 of the cross between two of the inbreds, CP 9 and CP 14. Results with this cross suggested that pollen abortion and low seed set were inherited on a highly complex basis. Both dominant and recessive factors may have been responsible for high pollen sterility. Data from a reciprocal cross involving a highly pollen-sterile F_2 segregate of one of the open-pollinated families and a plant with low pollen abortion from Dakold S_3 further suggested that cytoplasmic control may also play a role. In a number of progenies of CP 9 x C 14, meiotic irregularities not present in the parents were observed, such as 6 bivalents and 2 paired fragments, a tripolar spindle condition, long chromosomes and a translocation. In other plants, however, meiotic abnormalities appeared to be inherited, the same irregularity occurring in the parent and its progeny or in two sib progenies. Limited investigations suggest that the development of lines uniform for low pollen abortion and high seed set should be possible.

- 1925 MORI, T.
(Experimental studies on the chromosomes of the components of twin seedlings).
 Senshokutai (Chromosome)/Kromosomo
 1950 : No. 7 : p. 301. [Japanese].

A note is presented on the occurrence of twin seedlings in rye and on the use that can be made of such plants for chromosome investigations.

MAIZE

- 1926 WELLHAUSEN, E. J.
 Comparación de variedades del maíz obtenidas en el Bajío, Jalisco y en la Mesa Central. **(Comparison of maize varieties obtained in the Bajío, Jalisco and the Mesa Central).**
 Foll. téc. Secretaría Agric. Ganad., México 1947 : No. 1 : Pp. 40.

The open-pollinated varieties in the main maize-growing areas of Mexico were collected

and tested in various places. From 240 samples tested in the Bajío, 15 were selected on the basis of yield and agronomic features. The first lots of seed distributed gave yields of 25–60% above the average for late varieties, 30–54% for medium and 15–49% for early varieties. In the Mesa Central, the best late varieties yielded 20–28% more than the local variety Chalco and the best early varieties 54–56% more than the average.

- 1927 PATERNIANI, E.
 Notas de um estágio no México. **(Notes on a visit to Mexico).**
 Ann. Esc. Agric. Queiroz 1952 : 9 : 285–94.

Reference is made to the cooperative programme of research being carried out by the Mexican ministry of agriculture and the Rockefeller Foundation (cf. Absts. 1881 & 1937).

- 1928 SANTOS, I. S.
Combining-ability test of College White Flint inbred lines.
 Philipp. Agric. 1952 : 36 : 290–93.

Top crosses were made between twenty S_3 inbred lines of College White Flint and Bicol White Flint maizes to test the combining ability of the inbreds. Observations on height of ear from the ground, height of the plant, number of leaves, susceptibility to lodging, resistance to disease and insect pests and date of tasseling were made. C 103–1.1.1 and C 117–1.2.2 showed the highest combining ability and their top crosses gave the highest yields. There appeared to be no simple relationship between yield and the characters studied.

- 1929 MAZOTI, L. B. & SOSA, H. A.
 Ensayos con maíz realizados en el Nordeste argentino durante el quinquenio 1948–1952, y observaciones sobre otros cultivos. **(Tests with maize carried out in the north-east of Argentina during the five years 1948–52 and observations on other crops).**
 Idia 1953 : No. 65 : 12–17.

Two maize crops a year were obtained for breeding purposes by sowing in Formosa (northern Argentina) in June–July and Castelar (Buenos Aires) in March–April. The results of comparative tests with a number of varieties and hybrids showed a dent variety Toffoletti, selected by a farmer in the northern zone, to be possessed of exceptional yielding ability; it is recommended for cultivation in the Formosa area and for breeding purposes. Local selections of Venezuela I are also recommended.

Tests are also being carried out with wheat and various forage plants, and crosses have been made between teosinte and tassel-seed maize (ts_2), with the object of producing a tassel-seed type of teosinte to facilitate seed production.

1930 PETERSON, P. A.

A mutable pale green locus in maize.

Genetics 1953 : 38 : 682-83. (Abst.).
[see also Diss. Abstr. 1953 : 13 : Publ. No. 5998 : p. 960].

The mutable locus pg was detected in testing the effects of irradiation from the Bikini atom bomb explosion upon maize kernels. Two seedling phenotypes are associated with this locus: (1) a stable type (pg^s) characterized by a uniform pale green colour, except for occasional sectors of green stripes, and (2) a variegated type (pg^m) possessing numerous dark green stripes on a pale green background. The green stripes represent mutations at the locus pg to the normal allele Pg . Data on F_2 segregation ratios indicate that an independent factor En (enhancer) increases mutability at pg . The position of En varies; it may be adjacent to pg or transposed to another chromosome; in one instance, En was linked with pg at a distance of approximately 36 cross-over units. The gene pg^s mutates to pg^m with a low frequency (1/420); pg^m mutates to pg^s at the rate of approximately 2.5-4% in the gametes of $pgEn$ pollen parents. The mutable locus, it is postulated, represents the association of an inhibitor I with Pg , a pale green phenotype resulting. Loss of I under the influence of En is manifested in the mutation of the condition pg to Pg .

1931 HARRIS, R. & PHINNEY, B.

Auxin relations in a dwarf-1 allele of *Zea mays* L.

Genetics 1953 : 38 : p. 667. (Abst.).

Experiments were carried out to compare the coleoptiles of dwarf and normal seedlings with respect to their anatomy, auxin production and auxin inactivation, and also to study the response of decapitated coleoptiles to added auxin and to substituted coleoptile tips. The results suggested that auxin supply is not the limiting factor involved in the suppressed growth of the coleoptile in the dwarf seedlings.

1932 RAMESHWAR SINGH

Experiments with maize.

Proc. Bihar Acad. agric. Sci. 1953-54 : 2-3 : 118-20.

The following characters were found at Sabour to be monogenic recessives: various kinds of

dwarfs, male sterility due to deformed tassels or to nondehiscence of the anthers, and ball ear, in which the cob splits lengthwise to form a globose ear. Barren stalk, in which the plants produced no ear, was controlled by two or more pairs of factors, and susceptibility to *Marasmi* spp. appeared to be recessive.

1933 DI MARTINO, V.

I mais ibridi nelle colline del Garda. (Hybrid maize in the Garda hills).

Agric. bresciano 1954 : 2 : No. 12 : p. 2.

Yields of 65.29-88.90 q. per ha. are reported for hybrids grown in 1953 on poor land on high ground in northern Italy, where local varieties such as Scagliolo 23A have never yielded more than 45-50 q. per ha. Hybrids suitable for different areas are recommended.

1934 MONTANARI, V.

I mais ibridi nelle Venezie: diffusione attuale e prospettive d'incrementi futuri. (Hybrid maize in the Venetian provinces: its extent at present and the prospects of future increase).

Agricoltura d. Venezie 1954 : 8 : 75-106.

Reference is made to records of the cultivation of maize in the vicinity of Venice in A.D. 1539 and the years following. Figures are given which show that the yields gradually rose until the second world war, after which there was a further rise, due in part to the cultivation of hybrid maize. Details are given of the areas occupied by the different maize varieties; the area under hybrid maize in 1953 was still only about 7% and is expected to rise to 20% by 1956. The hybrid maize exceeded the old-fashioned varieties in yield by 19.41 q. per ha. in spring sowings in 1953 and by 8.35 q. per ha. in summer sowings. The hybrids have displayed greater resistance to drought and lodging owing to their deeper and stronger root systems and suffer less damage from hail and heavy rain than do the local varieties; their straw is more palatable to livestock and their grain more nutritious. Although they have sometimes been more severely attacked by corn borers, this is not accounted sufficient to discourage their cultivation. Other defects mentioned are the fact that the glumes do not completely enclose the ear and that they exhaust the soil more than the local varieties and therefore require higher mineral dressings. They are said to be less suitable for making *polenta* but cases are cited in which hybrids have been preferred even in this respect.

Some indications are given of the hybrids

found most suitable for cultivating in the respective provinces.

1935 ŠČELOKOVA, Z. I.

(An improved method for inter-varietal hybridization of maize).

Agrobiologija (Agrobiology) 1953 : No. 4 : 133-36. [Russian].

At Har'kov the highest degree of heterosis was observed in crosses involving mother plants grown in the previous year under climatic and soil conditions widely different from those of the pollinators. The highest yielding hybrids of Har'kovskaja Belaja Zubovidnaja [Har'kov White Dent] x North Dakota and Har'kov 23 x North Dakota were obtained when the female parent originated from Kamyšin and the pollinator from Har'kov.

1936 SCHOKMAN, D. E.

The breeding and cultivation of maize.

Trop. Agriculturist 1953 : 109 : 103-10.

The yield of Ceylonese varieties is poor and the range of genetic variation low. Selection, therefore, gives only limited improvement. American and Italian varieties deteriorate outside their own latitude. Only Australian Improved Yellow Dent has so far been successful. Hybrid maize production is uneconomical in Ceylon. Top-crossing between local varieties and varieties from Java and America has however been successful.

1937 WELLHAUSEN, E. J.

El maíz híbrido y su utilización en México. (Hybrid maize and its utilization in Mexico).

Foll. téc. Secretaría Agric. Ganad., México 1951 : No. 6 : Pp. 57.

An outline is given of the development of maize breeding by the application of genetical principles. Selection, conscious or unconscious, acting on mixed populations of local and introduced material, has led to the formation of a very large number of maize races in Mexico, each adapted to a given set of local conditions; some of them show clear signs of intercrossing with *Tripsacum*, either directly or through the wild teosinte. Studies of the races existing all over Mexico have revealed the existence of certain very promising ones, which have been distributed after one or more generations of mass selection; these include the variety Celaya, which has done well in areas between 2000 and 2600 m. altitude in the Bajío, and Rocamex V-216 and V-221, which are earlier than Celaya and have yielded some 25% more than the local

varieties in areas from 1800 to 2000 m. Rocamex V-7 has outyielded the popular local variety Chalco by 19% in the Mesa Central up to 2600 m. and the local variety in Toluca valley by 35%, while Rocamex V-21 has exceeded the local varieties by 35% in the state of Mexico at altitudes of 2200 m. V-7 and V-21 are also stronger in the straw than the local varieties. V-520, a selection from San Luis Potosí, has excelled all others in the tropical zones.

The production of selfed lines of these and other varieties was started in 1940 and the best six of them have been used in the production of synthetics. One of the best of these is Rocamex VS-101, produced from three selfed lines and one local variety Urquiza; it has yielded 35% more than the local Mex.39 in unirrigated fields in the Mesa Central. In addition to their higher yields and standing power the synthetics have displayed greater drought resistance.

Still better results have been obtained from hybrids; for instance, a triple hybrid Rocamex H-1, from (Urquiza 54 x Hidalgo 3-5) x M 37-5, yielded 27% more than V-7 in irrigated sowings in the Mesa Central; under the same conditions the multiple cross H-2, obtained from crossing two synthetics, yielded 16% more than V-7. Another triple hybrid, H-120, from (Urquiza 54 x Puebla 6-1) x M 21-20, has given 33% more yield than V-21, and H-215, a double cross from four first-generation selfs, has given 41% more than the synthetic VS-320. Improvements of up to 20% in yield and 10 days in earliness have been obtained from double crosses in which each of the single crosses consisted of a hybrid between a selfed line and a good local variety such as Celaya or Jalisco 35. In choosing double crosses for distribution, preference is given to those which, if used for seed, still produce good synthetics; thus H-309, which outyields Celaya by some 29%, gives rise to a synthetic which exceeds it by about 15%.

1938 RICHEY, F. D.

Hybrid corn for Tennessee.

Bull. Tenn. agric. Exp. Sta. 1952 : No. 227 : Pp. 24.

Ways of producing different kinds of hybrid seed are described. Male-sterile plants which may make detasseling unnecessary are mentioned. The yields of 18 varieties and hybrids in the Tennessee State Maize Tests are given, and the importance of choosing well-adapted varieties is emphasized. Full-season, prolific hybrids are recommended for Tennessee generally and somewhat earlier hybrids for Eastern Tennessee.

- 1939 RIEDL, W. A. & RINCKER, C. M.
Hybrid-corn-adaptation trials in Wyoming for 1952. (Preliminary report).
Mimeogr. Circ. Wyo. agric. Exp. Sta. 1953 : No. 30 : Pp. 3.

Results of trials conducted at five stations, two on irrigated land and three on dry land, and using 23 hybrids at each station, are given. The hybrids were compared for yield of grain, moisture content, height of plants and the amount of forage when green and when dry.

- 1940 MEZZACAPPA, M. P.
Estudo da capacidade geral de combinação em milho. (**Study of general combining ability in maize**).
Ann. Esc. Agric. Queiroz 1952 : 9 : 325-56.

This doctor's thesis first outlines the main objectives in maize breeding in Brazil; there has recently been a tendency for preference to be transferred from the Catêto, or yellow flint corns previously grown, to the higher-yielding dents; the Catêto corns are described; some of them have harder grains than others, and variation occurs also in characters such as height of plant, earliness and resistance to pests, diseases and lodging. Crosses were made of the different forms among themselves and in top crossing with one particular form P-104, and the results with the three best varieties are presented here. Top crosses were made by pollinating selfed lines in the 2nd and 3rd inbred generation with mixed pollen from 15 plants chosen from a synthetic obtained by intercrossing the S_0 plants of the original variety. Data on plant height and yield in the S_1 to S_3 generations show that there was considerable heterozygosity up to that stage but from S_4 on there was greater uniformity. Yields of top crosses from S_4 lines show that in some cases the best lines could have been chosen on the basis of the behaviour of the S_1 plants. Clear differences in yield were observed between the different top crosses, although all of them showed a tendency to produce a greater weight of grain from the second ear and a larger number of plants with two ears. A correlation of about +0.4 was noted between height of plant and grain yield, and of between +0.7 and +0.8 between height of plant and height of ear. Two of the top crosses from the variety Marília gave more yield than the double cross Campinas IA-3531, and others equalled it, whilst some of the synthetics obtained from the Marília lines almost equalled it. Indications are given of lines from the varieties Marília and Ipanema which would

probably give good hybrids when intercrossed. Some promising top crosses with extremely early maturity were obtained from the Uruguayan variety Quarentão [Forty-day], and in these the correlation between plant height and yield was not quite so great.

- 1941 El maíz híbrido en la chacra. (**Hybrid maize on the farm**).
Idia 1953 : No. 66 : p. 16.

Observations made on 39 farms in the north of the province of Buenos Aires in Argentina showed the hybrid maize tested to be more resistant to drought and lodging, more uniform, 20-25 days earlier in ripening, and 41% higher in yield than the common varieties, some hybrids showing an excess of yield of up to 100%. The dent hybrids were somewhat more susceptible than the varieties to smut and ear rot.

- 1942 ROSBACO, U. F.
Métodos de mejoramiento del maíz en zonas marginales. (**Methods of breeding maize in marginal zones**).
Idia 1953 : No. 70 : 12-14.

Mention is made of the advantage of using S_1 lines rather than advanced inbreds for the production of commercial hybrids. Figures from three successive years are presented to show that satisfactory yields can be obtained also from top crosses of the type variety x double cross; they are as uniform as commercial hybrids and give a better chance of growing a satisfactory F_2 .

- 1943 UICHANCO, L. B.
A history of rice and corn improvement in the Philippines.
Philipp. Agric. 1952 : 36 : 283-89.

The introduction and development of rice and maize varieties in the Philippines are reviewed. Crosses are being made to combine the high yield of *Oryza sativa* subsp. *japonica* with the tropical adaptability of *O. sativa* subsp. *indica*. Attempts to increase the popularity of maize, which is used only to supplement rice, have been made. American hybrid seed has not grown well, and locally adapted hybrids are needed.

- 1944 NAKAMURA, N. & TATE, S.
(**On first generation hybrid maize for grain production, using advanced hybrid generations**).
Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 142-46.

The period between planting and inflorescence production was studied in the inbreds B 8, A 151, WF 9, M 14, and various F_1 , F_2 and

back-cross combinations. The vegetative cycle was shortest in the F_1 hybrids, whence it is concluded that F_2 grain may not ripen naturally in northern Japan. Variance in silking date did not differ for the F_1 and F_2 hybrids. In the case of tasseling date, the variance of the F_2 hybrids was greater than in the F_1 forms. However, since under commercial conditions variance in tasseling date is largely environmental, the time required for detasseling F_2 hybrids for grain production may not be greatly in excess over that required for the F_1 hybrids.

1945 MALIANI, C.

Il punto sulla situazione: i mais ibridi.
(How matters stand concerning
hybrid maize varieties).

G. Agric. Domen. 1954 : 64 : p. 61.

In order to ensure that only genuine F_1 seed is supplied to Italian growers and to facilitate any future exports of such seed, a certificate of authenticity, with a guarantee of purity and germination capacity, will be issued by the Stazione Sperimentale di Maiscoltura, Bergamo. Certified seed must be raised in accordance with the methods prescribed by the station.

1946 HALTIWANGER, W. L., FRIANT, R. J. & BOLYARD, V. L.

Results of hybrid corn yield trials in
West Virginia, 1953.

Curr. Rep. W Va agric. Exp. Sta. 1954 :
No. 6 : Pp. 8.

An account is given of trials of 121 hybrids and the results are tabulated. A revised list of hybrids recommended for West Virginia is included.

1947 BRIM, C. A.

Heritable and non-heritable variation
in segregating generations of two
single cross hybrids of maize (*Zea
mays* L.).

Abstr. doct. Diss. Univ. Neb. 1953 : 1-4.

Two single crosses, P 8 x L 317 and A 374 x Oh40B, were made and bulked progenies were reared up to the F_6 . Estimates of heritability were then made for various characters in the F_2 - F_5 , preliminary analysis of the parental F_1 variances having shown that an arithmetic scale was most appropriate. In general, heritability was high for all the characters studied, but did not increase from the F_2 to F_5 .

1948 LONNQUIST, J. H.

Heterosis and yield of grain in
maize.

Agron. J. 1953 : 45 : 539-42.

Experiments at the Nebraska Agricultural
Experimental Station showed that crosses

among high-combining Krug lines gave higher yield and a lower genotype x season interaction than crosses between high and low-combining Krug lines. These results contrast with the conclusions drawn by Hull (cf. *PBA*, Vol. XV, Abst. 996).

1949 LENG, E. R.

Expression of heterosis and apparent
degree of dominance in the major
components of grain yield in maize.

Genetics 1953 : 38 : 674-75. (Abst.).

Grain yield was separated into four primary and two secondary components. The former comprised number of ears per plant, kernel weight, row number and number of kernels per row; the latter were weight of grain per ear and number of kernels per ear. The expression of heterosis and the apparent degree of dominance for each component and for total yield were investigated in 92 F_1 hybrids and their inbred parents. The degrees of both heterosis and dominance were lower for the primary components than for the secondary components or for total yield. No evidence of overdominance effects in any of the primary components was obtained.

1950 ANDREW, R. H.

Some aspects of maize breeding in
the United States.

Versl. StudKring. PlantVeredel., Wagen-
ingen 1954 : 517-27. (Mimeographed).

A brief history of maize breeding in the USA is given, with particular reference to Wisconsin, and an account of the mechanism of heterosis, the use of double crosses and breeding for resistance to stalk rot and cold is presented.

1951 WELLHAUSEN, E. J. & WORTMAN, L. S.

Combining ability of S_1 and derived
 S_3 lines of corn.

Agron. J. 1954 : 46 : 86-89.

The first maize hybrids produced in the Mexican Agricultural Program of the Rockefeller Foundation were combinations of S_1 lines (cf. Abst. 1937). These hybrids were markedly superior to open-pollinated varieties in yield and other characters. Experiments have been carried out to determine whether further inbreeding, accompanied by visual selection, would result in still greater improvements. The S_1 parents and the S_3 lines were top-crossed with one or more tester varieties. When the S_3 lines were tested in the hybrid combinations under conditions similar to those under which they had been developed, a small positive gain in combining ability was evident. The correlation value between the mean yields of the S_1 and their S_3 descendants in

the top crosses were all positive and highly significant.

1952 GALINAT, W. C.

The genetics and morphology of corn grass, a macromutant of maize.

Genetics 1953 : 38 : p. 663. (Abst.).

The action of the gene *Cg* controlling the corn-grass mutant is highly susceptible to genetic modification. Modifiers suppress the effect of *Cg* when either heterozygous or homozygous. This effect is, however, greater when *Cg* is heterozygous, since in certain stocks the originally dominant gene segregates as a recessive. These plus modifiers, as the genes reducing the expression of *Cg* are termed, usually possess some degree of dominance. One popcorn inbred, when crossed with corn grass carrying plus modifiers, had the capacity to restore the grass-like characteristics to the hybrid progeny. It is suggested that the presence of a dominant minus-modifier complex in certain races of maize may be related to their more primitive status.

1953 MCCLINTOCK, B.

Induction of instability at selected loci in maize.

Genetics 1953 : 38 : 479-99.

Conclusions concerning the mode of operation of the dissociation-activator (*Ds-Ac*) system which is responsible for extragenically-induced instability at certain loci are surveyed (cf. *PBA*, Vol. XXIII, Abst. 5). Mutability at the loci *C*, *Bz* and *Wx*, due to *Ac-Ds* activity, has been previously described. The present paper reports investigations showing that mutability controlled by this system can also occur at other loci, viz. *A*₁ in the long arm of chromosome 3 and *A*₂ in the short arm of chromosome 5. An account of methods used to detect such instability at *A*₁ and *A*₂ is given, the case of mutation at the locus *a*₁^{m-4} being analysed in detail.

1954 PIROVANO, A.

Possibilità di influire sulla trasmissione dei caratteri ereditari negli incroci di granoturco. (Possibility of influencing the transmission of hereditary characters in maize crosses).

Ann. Sper. agr. 1954 : 8 : 5-16.

In a cross made in 1927 between Golden Bantam and Black Beauty, a starchy variety with black seed, the expected 25% of sugary kernels were obtained in the hybrid progeny and the black colour also showed monohybrid segregation independent of sugariness. In certain plants arising from pollen of Black Beauty treated with alternating magnetic fields and X-rays, ears showing segregation for sugariness but no black

pigmentation were observed. Similar treatment of the pollen of the sugary variety Saverio led to a gradual reduction in the proportion of sugary grains in the ears resulting from its use in pollinating Golden Bantam. Some ears had no sugary kernels and all their grains bred true for starchy endosperm, though they were chemically different from those of the maternal parent, which had a higher gluten content.

A series of more recent experiments is described in which Golden Bantam was fertilized with pollen of Black Beauty treated with electromagnetic fields and X-rays in varying dosages. Both types of treatment reduced the proportion of black kernels and, at times, also of sugary kernels. This latter effect is ascribed to the greater efficiency of starchy pollen in competition with sugary when pollen is applied in large quantities on artificial pollination.

The treatment with X-rays was more effective than the electromagnetic treatment in reducing the pigmentation, one family from pollen irradiated 4 days before anther dehiscence having 33.7% of yellow ears. Some of the ears arising from pollen treated electromagnetically showed a fusion of the yellow and purple pigments of the parents, and their progeny remained constant for this intermediate character. Further experiments are being carried out to determine whether this method of obtaining constant intermediate hybrids can be extended to other characters and other species.

1955 GROBMAN, A.

Mejoramiento rápido y barato de semilla de maíz mediante selección masal con control de polen. (Rapid and cheap improvement of maize seed by mass selection with control of pollen).

Agronomía, Lima 18 : No. 75 : 83-88.

The proposed method consists of removing the tassels from all undesirable plants in a plot to be used for seed, retaining only the best ears for seed production; the seed so produced is sown in a separate seed-production plot, protected from foreign pollen by an isolation distance of over 300 m., and the selection process repeated indefinitely.

1956 WELLHUSEN, E. J., ROBERTS, L. M. & HERNÁNDEZ X., E.

Razas de maíz en México. Su origen, características y distribución. (Maize races in Mexico. Their origin, characteristics and distribution).

Foll. téc. Secretaría Agric. Ganad., México 1951 : No. 5 : Pp. 237.

This is the Spanish version of the work referred to in *PBA*, Vol. XXIII, Abst. 1158.

- 1957 PUNNETT, H. H.
Cytological evidence of hexaploid cells in maize endosperm.
J. Hered. 1953 : 44 : 257-59.
All stages of an endomitotic cycle resulting in hexaploid cells were observed in eight-day-old endosperm tissue. The presence of 30 pairs of chromosomes during prophase and metaphase indicated that normal mitosis was proceeding after double duplication of the chromosomes during the resting stage. Anaphase was regular and 60 daughter chromosomes could be counted at each pole; no further division of the hexaploid cells was observed.
- 1958 KADAM, B. S.
Chromosome studies in relation to fertility and vigour in inbred and open pollinated strains of auto-tetraploid maize; 2. Behaviour of 41, 39 and 38 chromosome plants.
Indian J. Genet. 1953 : 13 : 7-17.
Data on the behaviour of chromosomes at meiosis are given and show that average quadrivalent formation is similar in all three types of plants to that in 40 chromosome plants. The distribution of chromosome numbers in the microspores differs significantly in the three types studied but is very close in their progeny, indicating the elimination of unbalanced microspores. Plants with 38, 39, 40 and 41 chromosomes did not appear to differ in vigour but 42 chromosome plants were significantly shorter. Fertility and seed-rate in 40, 41 and 38 chromosome plants were similar.
- 1959 FORD, L.
A cytogenetic comparison of maize monoploid derivatives and inbreds.
Agron. J. 1954 : 46 : 34-36.
Observation of the progenies of crosses I 205/L 289 x autodiploid strains, haploid x diploid and haploid x haploid strains and I 205/L 289 x inbreds showed that meiotic aberrations and pollen abortion were no more frequent in monoploid derivatives than in inbred lines.
- 1960 ROCA, J. & ONDARZA V., R.
Estudios sobre la actividad enzimática en el proceso de germinación. V. Catalasa en variedades de maíz. (Studies on enzyme activity during germination. V. Catalase in maize varieties).
An. Inst. Biol. Univ. Méx. 1953 : 24 : 15-21.
In V_{520} , which is adapted to a height between 0 and 1000 m., maximum catalase activity occurred at 30° C, in Ramillan (100-1900 m.) and in the hybrid H_1 (1900-2300 m.), the maximum catalase activities were at 25° and 15° C, respectively.
- 1961 VILLAX, E. & MASCARENHAS, G. H. N.
Notas acerca das inflorescências, floração e fecundação do milho (*Zea mays* L.). [Notes on the inflorescences, flowering and fertilization in maize (*Z. mays* L.).]
Melhoramento 1953 : 6 : 115-47.
A review is presented of published information, together with the results of some original observations, on the development of the floral organs, the course of flowering in the male and female inflorescences, pollen viability and germination, development of pollen tubes, receptivity of styles, time at which fertilization is effected, and the extent to which these processes can be influenced by environmental conditions.
- 1962 **Bringing hybrid corn up-to-date. Progress in breeding and new uses reported at Eighth Industry Conference.**
Seed World 1953 : 73 : No. 12 : 16-19.
D. F. Jones stated at the conference that the commercial success of using male sterility for breeding depended on the use and greater experience of pollen restoring factors. W. Brown traced the sources of germ plasm in the United States, Mexico and West Indies and some of the history of flint maize and southern dents.
- 1963 WARREN, F. S. & DIMMOCK, F.
The use of chemicals and of male sterility to control pollen production in corn.
Canad. J. agric. Sci. 1954 : 34 : 48-52.
In experiments at the Central Experimental Farm, Ottawa, spraying with solutions of maleic hydrazide of concentrations ranging from 0.025 to 0.15% did not inhibit pollen production in the three maize hybrids studied. Cytoplasmic male sterility has been transferred to two inbred lines by crossing these with male-sterile single crosses and back-crossing to the inbred parents. Seasonal conditions influenced pollen production in the single cross x inbred hybrids. Phenotypically, the single cross x inbred² plants closely resembled their respective inbred parents.
- 1964 LENG, E. R. & WOODWORTH, C. M.
Effects of long-continued selection for oil and protein content in maize.
Genetics 1953 : 38 : p. 675. (Abst.).
Selection over 54 generations for high oil, low oil, high protein or low protein content was completed

in 1953 at the University of Illinois. Progress in the direction of selection continued, at varying rates, up to very recent generations of all four selected strains. The rate of progress in the two strains selected for oil content differed greatly, apparently because of differences in the effects of selection upon the two major components of oil content. Statistical analyses and the results of five generations of reverse selection indicate that at least three of the four strains still retain a considerable amount of genetic variability.

- 1965 USTINOVA, E. I. & DJAKOVA, M. I.
(The processes of fertilization and of the development of the embryo and endosperm in maize).
Dokl. Akad. sel'skokochozjaistv. Nauk Lenin. (Proc. Lenin Acad. agric. Sci.)
1953 : No. 5 : 9-15. [Russian].

An account is given of embryological investigations of the variety Čišminskaja when pollinated either with pollen from other Čišminskaja plants or with mixed pollen from two other varieties. The pollinators used were Minnesota, Krahmalistaja [Starchy] and Saharnaja [Sugar].

- 1966 REEVES, R. G.
Comparative morphology of the American Maydeae.
Bull. Tex. agric. Exp. Sta. 1953 : No. 761 :
Pp. 26.

A study was made at the Texas Agricultural Experiment Station of 23 morphological characters of *Tripsacum dactyloides*, teosinte and maize. Teosinte proved to be similar to or intermediate between *Tripsacum* and maize in all but two doubtful characters, suggesting that it originated as a hybrid between maize and an 18-chromosome *Tripsacum*.

- 1967 KATO, Y.
(Twin plants in maize).
Senshokutai (Chromosome)/Kromosomo
1951 : No. 11 : 401-06. [Japanese].

Twin kernels observed in a *Tp-ij-gl* line were classified in respect of pericarp, endosperm, seedling and mature-plant pigmentation, and the frequency of occurrence of the various *Tp* types recognized by Sato (cf. *PBA*, Vol. XXII, Abst. 1860) was ascertained. All the components of the twin grains had normal chromosome numbers.

- 1968 CAMERON, J. W. & TEAS, H. J.
Carbohydrate relationships in developing and mature endosperms of brittle and related maize genotypes.
Amer. J. Bot. 1954 : 41 : 50-55.

Investigations were carried out on the effects of

the independent genes brittle-1 (*bt₁*) and brittle-2 (*bt₂*) upon the contents of carbohydrates in the developing endosperm. Endosperms of the *bt₁* and *bt₂* types were similar in their carbohydrate accumulation, but differed markedly from normal endosperms. During their later development, *bt₁* and *bt₂* endosperms had a higher content of reducing sugars, a much higher content of sucrose and much lower content of starch than normal endosperms. They resembled, however, the normal type in possessing a low content of water-soluble polysaccharides at all stages in contrast to the *su₁* type, which accumulates a large amount of water-soluble polysaccharides. In mature *su₁bt₁* endosperms the usual effect of *su₁* upon the accumulation of water-soluble polysaccharides was eliminated, and the separate effects of each gene on sucrose and starch formation became more pronounced.

- 1969 ANDERSSON, G.
Majs för ensilering. (Maize for ensilage).
Allmänna Svenska Utsädesaktiebolaget,
Svalöf 1953 : 24-25.

Three silage maizes now obtainable from the General Swedish Seed Company are mentioned, the early-ripening Danish variety Eagle Hill, an American hybrid W 464 and an unnamed German hybrid. Eagle Hill is a relatively short type, yielding about 50 tons of green forage and about 8000 food units per ha., while the fibre content is only about 20%; it is suitable as silage for high yielding milch cows. W 464, which averaged about 70 tons of green matter per ha., with a fibre content of 25-30%, is relatively resistant to cold and to diseases and pests; it is recommended where fodder value is not so important.

- 1970 MELHUS, I. E. & CHAMBERLAIN, I. M.
A preliminary study of teosinte in its region of origin.
Iowa St. Coll. J. Sci. 1953 : 28 : 139-64.

A report on the distribution, growth, yield, food value, cultivation, harvesting and milling of teosinte in Guatemala is given. It is found chiefly in isolated areas between 2000 and 5000 ft. Maize pathogens attack teosinte but are not destructive. The grain can be separated from the hull by primitive and modern methods and products made from the flour are palatable. The grain is richer in protein than that of maize, rice or wheat, indicating the possibility of improving the protein content of maize through hybridization.

1971 FERWERDA, F. P.

Indrukken tijdens een reis door de Verenigde Staten ter bestudering van de maisveredeling en verwante onderwerpen. (**Impressions during a journey through the United States to study maize breeding and kindred projects**).

Euphytica, Wageningen 1954 : 3 : 68-73.

A general account of maize breeding in the USA is given, emphasis being laid on breeding for resistance to diseases, pests and cold, the value of male sterility in hybrid seed production and the use of haploids.

1972 HELGASON, S. B.

A study of genetic factors and techniques affecting cold-test performance in corn.

Diss. Abstr. 1953 : 13 : Publ. No. 5352 : p. 461.

Seed lots of maize were exposed to cold in laboratory tests. The stands obtained from seed of F_1 single crosses were similar to those of their maternal parents. Tests of the selfed seed of reciprocal F_1 hybrids, however, provided no evidence that this maternal effect persisted. The stands of F_2 bulk progenies were significantly correlated with the average stands of the parental inbreds, indicating genic determination of cold reaction. Inbred lines differed in combining ability for the cold reaction. The environmental conditions under which the seed was produced and the method of testing affected the relative stands, the environment having the greater influence. In testing, duration of the exposure to low temperature, level of soil moisture and duration of the warm period prior to cold exposure all significantly influenced the stands of inbreds and hybrids. An apparatus designed for cold tests in a household refrigerator is described. The results obtained, together with those of other investigators, indicated that the following procedures would be satisfactory in breeding for cold resistance: (1) evaluation of individual plants in segregating generations by testing bulked seed produced by their progeny in replicated plots, and (2) use of open-pollinated seed of inbreds or single crosses instead of selfed seed. Possible methods of genetical study of cold reaction are briefly described.

1973 KOEHLER, B.

Ratings of some yellow corn inbreds for ear rot resistance.

Plant Dis. Repr. 1953 : 37 : 440-44. (Mimeographed).

Tests of the ear-rot resistance or susceptibility of maize inbreds, as shown by the behaviour of

single and three-way crosses, were carried out over a period of several years at Urbana, Ill. Tables are given summarizing the results of the tests for reaction to the four most prevalent rots: *Diplodia zeae*, *Fusarium moniliforme*, *Gibberella zeae* and *Nigrospora oryzae*. The data show that the lowest amount of ear rot can be expected when an inbred transmits good physiological resistance, combined with well-covered ears and a high degree of ear declination towards a horizontal position; physiological resistance is apparently the most important character.

1974 HARPER, J. L.

Influence of temperature and soil water content on the seedling blight of maize.

Nature, Lond. 1954 : 173 : 391-93.

In experiments on the variety Virginian White Horsetooth at the Department of Agriculture, Oxford University, soil moisture and temperature were found to have important influence on the results of tests of seedling blight or so-called cold hardiness. These findings are discussed in relation to carrying out such tests in breeding.

1975 ULLSTRUP, A. J.

Some smuts and rusts of corn.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 386-89.

A relatively large number of genes determines resistance to *Ustilago maydis*, and breeding for resistance is complicated by physiological races occurring in the fungus.

1976 ROWELL, J. B. & DEVAY, J. E.

Factors affecting the partial vacuum inoculation of seedling corn with *Ustilago zeae*.

Phytopathology 1953 : 43 : 654-58.

Essential factors for high percentages of uniform infection are uniform, aseptic seedlings with a coleoptile 0.5-1 cm. long, removal of the coleoptile tips and an inoculum with at least 1 million cells of each line of smut per ml. Differences in the development of the disease were obtained with the various lines, crosses and mixed inoculations of the four smut lines 10A4, 17D4, 410qq and 410n. The cross 10A4 x 17D4 resulted in the largest percentage of gall tissue. Chlamydospore formation was suppressed in all crosses with 10A4 as a parent.

1977 ULLSTRUP, A. J.

Several ear rots of corn.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 390-92.

The inbred lines 540, Ill. R4 and Ill. 90 transmit resistance to *Diplodia zeae*.

1978 ANDREW, R. H.

Breeding for stalk-rot resistance in maize. A review.

Euphytica, Wageningen 1954 : 3 : 43-48.

Work on breeding for resistance to *Diplodia* and *Gibberella* stalk rots, including the inoculation techniques devised, is reviewed, principally with reference to research at the University of Wisconsin.

1979 JENKINS, M. T., ROBERT, A. L. & FINDLEY, W. R. (JUN.).

Recurrent selection as a method for concentrating genes for resistance to *Helminthosporium turcicum* leaf blight in corn.

Agron. J. 1954 : 46 : 89-94.

The effectiveness of recurrent selection as a procedure for concentrating genes for resistance to *H. turcicum* (cf. PBA, Vol. XXIII, Abst. 319) was studied in nine groups of maize progenies at the US Plant Industry Station, Beltsville, Md. Each group consisted of (1) a resistant inbred, (2) a susceptible Corn Belt inbred, (3) the cross between these, (4) the back cross to the Corn Belt inbred or F_2 generation of the cross, and (5) three successive generations of recurrent selections for resistance. In the majority of cases, the procedure was highly effective, two generations of recurrent selection being sufficient in most groups. The need for a third cycle depended on the amount of improvement accomplished in the first two.

1980 ROBERT, A. L.

Some of the leaf blights of corn.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 380-85.

Resistance in maize to *Helminthosporium turcicum* is governed by a large number of genes; resistance to *H. maydis* is determined by quite a different set.

1981 RAMESHWAR SINGH

Inheritance in maize of reaction to the European corn borer (*Pyrausta nubilalis*).

Indian J. Genet. 1953 : 13 : 18-47.

Lines of Minnesota inbreds were selected for resistance (R) and susceptibility (S) to injury from early leaf feeding by first-brood larvae. Resistance in the parents and in crosses of R x R, R x S and S x S in the F_1 , F_2 and backcrosses was studied. The mean resistance for each group was greater than the average for the parents. R x S plants showed dominance for resistance to leaf injury or overall injury or both, whilst others were intermediate in resistance. The control plants (Min. 408, Min. 503

and their four single cross parents), R x S and S x S plants gave significantly lower yields when grown on infested plots. Resistance did not seem to be correlated with lateness of maturity. It was calculated by Powers' method of analysis (cf. PBA, Vol. XX, Abst. 2692) that resistance in a selected R x S cross (A 279 x A 291) depended on two pairs of factors.

1982 Mais, 1954. (Maize, 1954).

Landbouwwoorlichting 11 : Bijl. 9; Ber. Rassenkeuze No. 161 : 1954 : Pp. 5.

Data on yield, maturity and shape and colour of grain of a number of Netherlands and American varieties and hybrids are presented. In trials conducted on various types of soil throughout the Netherlands, Vroege gele ronde C.B. [Early Yellow Round CB], Goudster [Golden Star], CIV 5 and Wisconsin 255 gave the highest yields in the early, medium early, medium late and late groups respectively.

1983 Silage corn yield tests.

Research, Kingston, RI 1953 : 3 : p. 55.

In silage maize tests Conn. 870, US 13, Penna 602, V25Y and V 26 gave the highest yields. All are late-season hybrids except Penna 602 which is midseason.

1984 PASS, H., BROOKS, J. S. & SMITH, J. W. **Performance tests of corn varieties and hybrids 1953.**

Misc. Publ. Okla. agric. Exp. Sta. 1954 : No. MP-33 : Pp. 23.

An account of tests of 146 varieties and hybrids carried out at five locations in Oklahoma is given. The results for yield, stand, lodging, quality and shelling score are tabulated.

1985 YORK, J. O.

Arkansas coastal plain corn performance test for 1953.

Mimeogr. Ser. Ark. agric. Exp. Sta. 1953 : No. 15 : Pp. 5 (Mimeographed).

The procedure of the tests is described and the results tabulated. Late and midseason hybrids are recommended for the area. Draper McCurdy 1005-2 gave the highest yield.

1986 YORK, J. O.

1953 corn performance test on grand prairie and similar soils.

Mimeogr. Ser. Ark. agric. Exp. Sta. 1953 : No. 16 : Pp. 5. (Mimeographed).

A description and the results of the tests carried out at Sautgart are given. Texas 28 gave the highest yield. The hybrids Dixie 11, Dixie 22, Embryo 165 W, Keystone 222 and Pfister (PAG) 631 are recommended for the area.

1987 YORK, J. O.

Arkansas upland corn performance tests for 1953.

Mimeogr. Ser. Ark. agric. Exp. Sta. 1953 : No. 17 : Pp. 10. (Mimeographed).

Tests carried out are described and the results given. Hybrids recommended for each area on the basis of these and past tests are given. Texas 28 yielded most at the Main Experiment Station and Keystone 107 W at the Livestock and Forestry Station.

1988 YORK, J. O.

Eastern Arkansas corn performance tests for 1953.

Mimeogr. Ser. Ark. agric. Exp. Sta. 1954 : No. 18 : Pp. 11. (Mimeographed).

The results of tests carried out at the Cotton Branch Experiment Station and the Delta Substation are given and varieties are recommended for each area on performance over the past three or more years. The highest yielding open-pollinated variety was taken as the standard. Golden Prolific was the standard at the first station with only the hybrid Draper McCurdy yielding significantly more. Miss. 1123, Dixie 22, Dixie 17 and Texas 24 hybrids yielded significantly more than Paymaster, the standard at the Delta Substation.

1989 ROBINSON, J. L. & HUTCHCROFT, C. D.
1953 Iowa corn yield test.

Bull. Ia agric. Exp. Sta. 1954 : No. P116 : Pp. 31.

Tests of 229 hybrids each planted in at least three locations were carried out. The conditions and methods used are described and the results presented in a series of tables. The hybrids were ranked according to performance based on yield, moisture content, lodging and dropped ears. Those ranking above average for each district are listed.

1990 SHIDELER, F. J.

Cuban yellow corn in Bolivia.

Foreign Agric. 1953 : 17 : 210-11.

Cuban Yellow maize has been introduced into Bolivia and is outyielding local varieties.

BARLEY

1991 SHEBESKI, L. H.

The production of beneficial mutations in barley by irradiation.

Cereal News 1952 : 1 : No. 2 : 4-8.

Plants of the variety Montcalm were treated with P³², X irradiation by betatron, and γ rays or combined γ and neutron irradiation. The two groups of mutations observed were

chlorophyll deficiencies and nondetrimental mutations. Results showed that the type of treatment given affects number and proportions of these mutations. Mutations for earliness, stiffness of straw, two-rowed types and hooded types were obtained. Some of the mutants will be entered in yield tests.

1992 BJAANES, M.

Forsøk med toradet bygg. (Experiments with 2-rowed barley).

Meld. Stat. Forsøksg. Møistad 1946 and 1947 (1953) : H94-H112, H126-H130.

In variety trials of the 2-rowed barleys Opal B, Maja and Kenia during 1935-46 in the Hedemark and Opland districts of Norway, Opal B was the earliest, and Kenia four days later. Maja and Kenia had stiffer straw than Opal 13 and Maja gave the highest grain yields both at the Møistad Experimental Station and in local trials, averaging 24 kg. more per dekar than Opal B, a line selected at Svalöf from the original Danish barley Opal, and 28 more than Kenia. Other barleys, whose performance and characteristics in some of the trials are briefly mentioned, are the Svalöf variety Freja; the 6-rowed Varde; line 0306 (Asplund x Opal B); line 0153 (Maskin x Opal B); line 013-1 (Maskin x Binder), which nearly equalled Opal B in yield, is slightly earlier and has a slightly stiffer straw; and line 01435 (Maskin x Opal B) which is rather later than either parent, yields about 6 kg. per dekar less than Opal B and has a stem not only longer but also far stiffer than that of the usual 2-rowed barleys. Lines 0153 and 01435 have also particularly large grain. One section of the report gives an outline of barley breeding at Møistad from 1931 to 1947.

1993 HARRINGTON, J. B.

Husky, the new high yielding rust resistant feed barley.

Circ. Field Husb. Univ. Saskatch. 1953 : No. 559 : unpaginated. (Mimeographed).

A fodder barley, Husky, has been developed from the cross [(Peatland x Regal) x OAC 21] x Newal. It is six-rowed, smooth-awned, and has yellow seeds and strong straw of average length; it matures in midseason or later, is high yielding, adaptable to different soil and climatic conditions, and resistant to stem rust.

1994 SUNESON, C. A. & STEVENS, H.

Studies with bulked hybrid populations of barley.

Tech. Bull. US Dep. Agric. 1953 : No. 1067 : Pp. 14.

Six composite crosses grown for 6-24 generations

were studied. The 2-rowed, hooded, smooth-awned and black-seeded characters showed low survival. Selection for large and for small seeds increased the incidence of 2-rowed and black-seeded characters in these selections respectively. Susceptibility to smut did not decrease but early maturity did. Yield data suggested that a continuous yield improvement over a long period could be expected. Character associations appeared more important in determining survival than specific characters and character combinations of the most adapted parents were recovered as in back-cross breeding whilst others disappeared. Seedlings with environment-induced albinism were poor competitors in a mixed population.

1995 SIMONET, M.

Étude cytologique d'un hybride naturel intergénérique d'*Hordeum* et d'*Agropyrum*: x *Hordeopyrum Rouxi* Nob. (**Cytological study of a natural intergeneric hybrid between *Hordeum* and *Agropyrum*: x *Hordeopyrum Rouxi* Nob.**).

CR Acad. Sci., Paris 1953 : 237 : 1755-57.

Two instances of natural hybridization between the tetraploid *Hordeum secalinum* ($2n = 28$) and the hexaploid *A. repens* var. *littore* ($2n = 42$) were discovered in the Mediterranean area. The resulting heptaploid plant, named *Hordeopyrum rouxi* ($2n = 49$), was completely sterile and possessed a double chromosome complement from *H. secalinum*, its female parent.

1996 SHEBESKI, L. H. & LAWRENCE, T.

The production of beneficial mutations in barley by irradiation.

Canad. J. agric. Sci. 1954 : 34 : 1-9.

In investigations at the University of Saskatchewan, Canada, the six-rowed, smooth-awned barley Montcalm was subjected to (1) P^{32} treatments, (2) neutron + γ irradiation from radium-beryllium, (3) γ irradiation only and (4) high-energy X irradiation, using the betatron. The progeny of the treated plants contained chlorophyll-deficient, early-maturing, two-rowed, stiff-strawed and several other mutants; the behaviour of the aberrants in the succeeding generation is described. The neutron treatments gave the highest total percentage of chlorophyll-deficient mutants. The most favourable proportion of vital to chlorophyll mutants was obtained with the P^{32} treatments. Twenty mutants underwent preliminary field trials in 1952. Only one stiff-strawed mutant, Sask. 5203, has, however, been tested sufficiently to warrant a report; the data so far obtained

indicate that this mutant represents an improvement in straw strength compared with Montcalm, without any loss in yielding ability and malting quality. In addition to the stiff-strawed variants, the early-maturing aberrants may be of practical value.

1997 YAMADA, T. & HORIUCHI, S.

(Studies on the occurrence and mechanism of nongenetic variation due to competition. I. Modification in phenotypic development due to competition between different barley genotypes and its mechanism).

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 159-72. [Japanese].

Five Japanese varieties were grown singly and intermixed, and measurements of top weight and tiller number made in each case. When grown singly, the varieties differed little in the characters studied. When intermixed, however, the erect varieties developed at the expense of the procumbent forms. It is therefore recommended that in selecting segregating populations, selection should be confined in the early generations to characters unaffected by competition, selection for characters influenced by competition being deferred until smaller populations are involved.

1998 SAWICKI, J.

Studia nad budową warstwy aleuronowej u odmian jęczmienia uprawnego *Hordeum sativum* Jess. (**A study of the structure of the aleurone layer in varieties of cultivated barley, *H. sativum* Jess.**).

Prace roln.-leśne, Kraków 1952 : No. 66 : Pp. 59.

A study was made of (1) the number of rows of cells in the aleurone layer and (2) its thickness, in a collection of 103 spring barley varieties, representing all the subspecies of *H. sativum* Jess. and derived from many countries; the transmission of the characteristics (1) and (2) to the progeny was also investigated in 40 of the varieties and later also in a series of 15 pedigree lines; and finally the grain of 28 varieties from Cambridge (England) was sown in Mydlniki (Poland) to test the effects of different climates on these characteristics.

Results showed marked varietal differences in the characteristics concerned; thus the average number of rows of cells in the aleurone layer varied from 1.64 to 3.11 and the average thickness of the layer from 49.94 to 110.16 μ . Analysis of the results from the 40 varieties showed that, in the case of the number of rows of cells, the varietal differences accounted for

85.6% of the total observed variation and, in the case of the layer thickness, the proportion due to varietal differences was 93.0%. Variation due to seasonal effects was very small and no relatively great modifications in these characteristics were produced by change of climate. No essential differences from the foregoing results were found on analysing the variation, in a 3-year period, for the pedigree lines.

Since the variation within the individual varieties for each of these characteristics measured in different years was generally small and the seasonal variation very slight, it is concluded that the number of rows of cells in the layer and its thickness are heritable varietal characteristics; as there is also a marked correlation between them they should be considered together in using them for the identification of varieties.

Within individual botanical varieties, e.g. *H. distichum* vars. *nutans* and *erectum*, distinct differences between cultivated varieties were found in regard to these two characteristics; such differences might serve as diagnostic criteria.

The results of the above investigations provide further evidence to confirm Orlov's previous conclusion that barleys from the Asiatic centre of cultivation generally have three rows of cells in the aleurone layer, whereas barleys from the African centre have two rows. The writer suggests that the similar differentiation found in cultivated European barleys might throw light on their origins, and that if economically useful characters should prove to be correlated with the structure of the aleurone layer as regards these two characteristics, this could be used in the choice of material for breeding.

A table shows the 103 varieties with the values for the two characteristics and the relevant group of each variety in the correlation table.

- 1999 HAGBERG, A.
Karyomorphological studies on barley.
 Hereditas, Lund 1954 : 40 : 263-64. (Abst.).

To avoid confusion, the author suggests that the designation of I-VII, first proposed by Tjio and Levan (cf. *PBA*, Vol. XX, Abst. 2070) for the chromosome pairs of barley, should be universally adopted among geneticists. The view is expressed that the designation a-g later used by Oinuma is an unnecessary innovation and could be easily equated with the figures I-VII.

- 2000 TSUCHIYA, T.
(On nucleolar chromosomes in barley).

Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 484-89. [Japanese].

Nucleolus formation was studied in trisomic and diploid derivatives of a hypotriploid plant of the variety Waseigorudenmeron [Early Golden Melon]. In one trisomic plant, the following modes of nucleolus formation were observed at diakinesis: (1) one nucleolus attached to a trivalent; (2) one nucleolus attached to a univalent; (3) one nucleolus attached to a trivalent and another to a bivalent; (4) one nucleolus attached to two bivalents and another to a univalent; (5) two nucleoli attached to a trivalent; and (6) one nucleolus attached to a trivalent or bivalent and another lying free. In other trisomic derivatives and in diploid offspring, a single nucleolus was attached to a bivalent. It is inferred from these observations that two pairs of nucleolar chromosomes are present, one of which is inoperative in the diploid and some trisomics.

- 2001 OINUMA, T.
(Caryomorphology of cereals. VII. A reciprocal translocation in barley and its caryomorphology).

Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 460-66. [Japanese].

A reciprocal translocation was detected among the F_1 plants of Waseigorudenmeron [Early Golden Melon] x Himarayanijo [Himalaya Two-rowed]. Measurements of the somatic chromosomes of normal F_1 plants and types carrying the reciprocal translocation suggested that the translocation may have been due to an exchange between the short arms of the e and g chromosomes.

- 2002 HUNTER, H.
Identification of barley varieties grown in the British Isles by examination of threshed grain.
 Wallerstein Labs Commun. 1953 : 16 : 327-37.

A table for the identification, on the basis of grain characters, of 12 malting varieties generally used in Britain is given.

- 2003 GRAFIUS, J. E. & DIRKS, V. A.
Climatic adaptation in a barley breeding program.

Agron. J. 1954 : 46 : 1-4.

The climatic conditions for which barley should be bred in South Dakota are discussed. Temperature rises fairly steadily from May to July; rainfall is highly erratic but a second degree least squares regression line for the average

daily precipitation indicates a mode in June. It is suggested therefore that too early varieties will fail to utilize the maximum available rainfall; Trebi CI 986 appears to have the optimum vegetative period.

2004 BANDLOW, G.

Mutationsversuche an Kulturpflanzen. III. Über genetische Vorstufen der Kapuzengerste mit variabler Manifestierung bei röntgeninduzierten Mutanten. (**Mutation experiments on crop plants. III. On genetical precursors in hooded barley with variable manifestation in X-ray-induced mutants**). Züchter 1954 : 24 : 20-27.

Two hooded barley forms arising from X irradiation are described; the mutant *calcaroides*, morphologically the more strongly expressed hooded form, showed incomplete dominance over *subcalcaroides*; when crossed with *Hordeum trifurcatum*, in which the factor for hooded outer glume is dominant, both mutants proved recessive. The evolution of true hooded forms such as *H. trifurcatum* is postulated as having been from the normal awned form to *inflatum* to *subcalcaroides* to *calcaroides* to the hooded form.

2005 MOH, C. C. & NILAN, R. A.

Multi-ovary in barley.
J. Hered. 1953 : 44 : 183-84.

A mutant in *Hordeum vulgare* 'Trebi,' induced by atomic bomb irradiation at Bikini, had more than one pistil per floret. The extra pistils were possibly derived from the anthers since these were usually absent or had stigmatic projections. The mutant is monogenic and recessive, and the symbol *mo* is provisionally suggested.

2006 **Reports from the counties.**

Mon. Rep. Minist. Agric. N. Ire. 1954 : 28 : 296-301.

Trials were made to discover suitable malting barley varieties with high yield, resistance to lodging and earliness in ripening. Both Carlsberg and Freja showed average superiority to Spratt Archer in these respects. A report on comparative malting quality is also given.

2007 HUTCHISON, A. O.

Some aspects of the 1953 barley crop.
J. Inst. Brew. 1954 : 60 : 16-20.

It is reported that Carlsberg II, Proctor and Beorna all show promise as malting barleys.

2008 Zomergerst, 1954. (**Spring barley, 1954**).

Landbouwwoorlichting 11 : Bijl. 2; Ber. Rassenkeuze No. 154 : 1954 : unpaginated.

The yields of grain and straw of both malting

and fodder barleys are compared and data on the quality and soil requirements of the main varieties cultivated in the Netherlands are given. Pirolina was the most productive of the malting varieties and Frisia gave the highest yield of the fodder varieties.

2009 FRÖIER, K.

Några synpunkter på produktionen av maltkorn och foderkorn. (**Some views on the production of malting barley and fodder barley**).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 6-9.

In this review of the characteristics and regional adaptation of malting and fodder varieties of barley in Sweden, the more practical aspects of the subject already treated in the article abstracted in *PBA*, Vol. XXIII, Abst. 1945 are considered.

2010 BONNE, K.

Sortenwahl mit Überlegung. (**Choosing varieties with care**).

Mitt. dtsch. LandwGes. 1954 : 69 : 223-24.

A popular account of factors to be considered in choosing cereal and root-crop varieties is given. In trials of winter barleys in Schleswig-Holstein in 1952-53, Brandts Marien reacted best with increased yields to additional amounts of nitrogen fertilizer.

2011 PENDLETON, J. W., LANG, A. L. & DUNGAN, G. H.

Response of spring barley varieties to different fertilizer treatments and seasonal growing conditions.

Agron. J. 1953 : 45 : 529-32.

Experiments carried out in Illinois showed there was a significant difference in the response of varieties to fertilizers. In comparison the effect of the season was not significant (cf. *PBA*, Vol. XXII, Abst. 2718).

2012 MEHTA, P. R., BABU SINGH, MATHUR, S. C. & SINGH, S. B.

Varietal reaction to covered smut of barley.

Sci. & Cult. 1953 : 19 : 262-63.

Twenty barleys have been tested at Kanpur, Uttar Pradesh, for their reaction to *Ustilago hordei*, using the vacuum method of inoculation. Four years' data showed that NP 21 and C 251, the most widely grown varieties in the state, are susceptible. Three varieties were classed as resistant, K 12, C 84 and CN 294; of these, K 12 is also resistant to *Helminthosporium gramineum* (cf. *PBA*, Vol. XXIV, No. 2 Abst. 1105).

- 2013 GRAKOVSKIĬ, P. P.
(Intervarietal vegetative hybridization of barley).

Dokl. Akad. sel'skokhozjaistv. Nauk. Lenin. (Proc. Lenin Acad. agric. Sci.). 1953 : No. 7 : 14-19. [Russian].

At Iljinec, new forms of barley have been obtained by grafting the embryo of one variety on to the endosperm of another. The material, selected for a high yield in later generations, included 3-2307-2/49, which outyielded the standard Hanna Loosdorf by 12.5 c. per ha., and 1-2305-6/49, which showed resistance to bacterial rot, *Puccinia* and *Helminthosporium*. They were obtained by grafting the embryo of Hanna Loosdorf on to the endosperm of Mestnyĭ Sestirjadnyĭ [Local Six-rowed] and Iljinec Partisan, respectively.

- 2014 FADELY, D. D.
The green bandit.

What's New Crops Soils 1953 : 6 : No. 3 : 10-11.

Experiments at the Oklahoma Agricultural Experimental Station have shown that three Korean barley varieties are highly resistant to green bug and that resistance is dominant. One durum wheat is moderately resistant.

- 2015 MCKINNEY, H. H.
New evidence on virus diseases in barley.

Plant Dis. Repr. 1953 : 37 : 292-95. (Mimeographed).

From experiments at the Bureau of Plant Industry, Beltsville, Md., evidence has been obtained that low yields of Glacier are due to infection by a seed-borne virus, few or no symptoms being expressed. Such infection could account for the "running-out" of certain barleys. The results from inoculations of the barley Chevron and other cereals with isolates from Glacier suggest that the virus responsible consists of mild strains of stripe mosaic.

- 2016 MULLIGAN, T. E. & TRAVERS, S. J.
Joint N.A.A.S./N.I.A.B. trials of spring barley varieties 1949-51. Spratt-Archer, Freja, Kenia and Plumage-Archer.

J. nat. Inst. agric. Bot. 1953 : 6 : 461-67.

Eight varieties of spring barley were compared in trials held at 19 centres throughout England. Freja gave the highest average yield of grain. Data on maturity, length of straw, and resistance to lodging, diseases and pests are included.

- 2017 ELIASSEN, S. & JACOBSON, G.
Sortförsök med korn. (Variety trials with barley).

Försök o. Forskn. 1953 : 10 : 26-28.

The report on which this article is based was summarized in *PBA*, Vol. XXIII, Abst. 2689.

MILLETS AND SORGHUMS

- 2018 STEPHENS, J. C. & HOLLAND, R. F.
Cytoplasmic male-sterility for hybrid sorghum seed production.

Agron. J. 1954 : 46 : 20-23.

The F_1 of reciprocal crosses of milo and Day with kafir made at Texas Agricultural Experimental Station was fertile but the F_2 of those with milo or Day as the female parent was partially male sterile and sterility was increased by back-crossing with kafir pollen. The combination of milo or Day cytoplasm and kafir chromosomes is said to be the cause of male sterility. Fertility was restored by crossing with milo or milo-Day F_1 plants as male parents.

- 2019 HARPSTEAD, D., ROSS, J. G. & FRANZKE, C. J.

The nature of chromatin changes in colchicine-induced variants in sorghum.

Genetics 1953 : 38 : 666-67. (Abst.).

The phenotypic changes observed in true-breeding variants induced by colchicine treatment (cf. *PBA*, Vol. XXIII, Abst. 349) are concluded to be due to minute chromatin changes of the nature of point mutations.

- 2020 ROSS, J. G., FRANZKE, C. F. & SCHUH, L. A.

Studies on colchicine-induced variants in sorghum.

Agron. J. 1954 : 46 : 10-15.

Progenies of true-breeding sorghum plants treated with colchicine at South Dakota State College showed a significantly greater range of variation than the progenies of untreated sibs although the chromosome number in both cases was $2n = 20$. The induced variants had high heritability. It is suggested that, in the colchicine-treated plants, chromosome doubling and subsequent reduction took place, with alteration and rearrangement of chromatin material.

- 2021 KAJJARI, N. B. & CHAVAN, V. M.
A male-sterile jowar.

Indian J. Genet. 1953 : 13 : 48-49.

A male-sterile plant (*ms*) detected at the Crop Breeding Station, Annigeri, is being used to

exploit heterosis in sorghum. Maldandi 35-1 x ms has given a 50% higher yield than the male parent. Other crosses and observations to find whether the ms character is associated with visible morphological characters are being made.

2022 KARUNARATNE, C. R.

Sorghum.

Trop. Agriculturist 1953 : 109 : 92-102.

Sweet and grain sorghums grown on Departmental Farms in Ceylon are discussed, and the milling qualities of several varieties compared.

2023 COLEMAN, O. H. & STOKES, I. E.

The inheritance of resistance to stalk red rot in sorghum.

Agron. J. 1954 : 46 : 61-63.

Resistance to stalk red rot (*Colletotrichum graminicolum*) was dominant and controlled by a single gene designated *Ls* in the cross between the susceptible variety Rex and resistant Sart. Resistance to leaf anthracnose, caused by the same pathogen, was also found to be dominant and monogenically determined (*L*), as reported by LeBeau and Coleman (cf. *PBA*, Vol. XX. Abst. 1658). The factor pair for reaction to stalk red rot and that for reaction to leaf anthracnose were linked with a cross-over value of 9.57% in the coupling phase. Resistance to either disease was inherited independently of seed-coat colour.

2024 LEFÈVRE, P. C.

Étude de *Calandra oryzae* L. sur sorgho (*Sorghum vulgare* Brot.). [**Study of *C. oryzae* L. on sorghum (*S. vulgare* Brot.)**].

Bull. agric. Congo belge 1953 : 44 : 1001-46.

Examination of samples of the sorghum varieties Mbogobogo and Budwakali from Kivu and Ruhinda and Rusoghya from Ruanda suggests that Ruhinda is the least subject to attack by *C. oryzae*, and Rusoghya the most.

2025 THURMAN, R. L. & BURDICK, A. B.

Grain sorghum experiments, 1950-1953.

Mimeogr. Ser. Ark. agric. Exp. Sta. 1953 : No. 14 : Pp. 6. (Mimeographed).

The results of trials carried out at four branch stations are given. The varieties giving the highest yield for each area are listed. Early Hegari and Plainsman performed well at each station.

RICE

2026 **Annual Report on the Department of Agriculture, Colony of North Borneo, for the years 1951 and 1952 : Pp. 49.** (Mimeographed).

Rice. In variety trials at Inanam, the local variety Gantang yielded well. At Kabusak, Gantang, Pai Kazo and Undus were superior to Pai Gazo.

2027 Relazione della giuria in merito al concorso selezione sementi di riso 1952. (**Report of the jury concerning the rice seed-selection competition of 1952**).

Quad. Staz. sper. Risic., Vercelli 1953 : Pp. 12.

Among the new varieties entered in the competition was one named Rossi which resembles Americano 1600 but ripens somewhat sooner, one with grain of extremely high quality bred by Colombo at Rovagenda and several with grain over 10 mm. in length produced by E. De Vecchi.

2028 SARAN, A. B. & RICHHARIA, R. H.

The new selections of paddies evolved between 1942 and 1952 at Sabour, Bihar.

Proc. Bihar Acad. agric. Sci. 1953-54 : 2-3 : p. 117.

The following strains have been evolved at Sabour in addition to those already recorded: BR 18, an aus rice flowering in 45 days; BR 45, a purple variety; BR 19 and 21, comparatively drought resistant; BR 24, particularly suited to Chotanagpur and Patra Ranges; BR 41, a marshland variety; and BR 46, showing non-shattering characters.

2029 JORDAN, H. D.

The development of rice research in Sierra Leone.

Trop. Agriculture, Trin. 1954 : 31 : No. 1 : 27-32.

This paper includes an historical account of work on the improvement of swamp rice by selection of local varieties, testing of introductions and hybridization. Some selection of upland rice has also been carried out.

2030 NOVELLI, N.

Appunti cronologici sulla Stazione Sperimentale di Risicoltura. (**Chronological notes on the Rice Experimental Station**).

Riso, Milano 1953 : 2 : No. 10 : 20-21; No. 12 : 19-20; 1954 : 3 : No. 1 : 22-24.

A somewhat fuller account of the foundation

and development of the station at Vercelli (cf. Abst. 360) is given by its first Director.

2031 CHOUDHRI, S. D. & SEN, J. L.

Inheritance of leaf sheath colour in spring paddy.

Pakist. J. sci. Res. 1953 : 5 : 64-67.

In the crosses B 111-17 (light purple sheath) x B 89 (green sheath) and B 219 (purple sheath) x B 43-111 (green sheath) made at Dacca, the F_1 generations were light purple and purple respectively. The F_2 generations indicated, and the F_3 confirmed, that two pairs of factors were involved in each case giving the ratio 9 light purple or purple: 7 green.

The cross B111-17 x B219 gave a light purple F_1 , and in the F_2 the ratio 9 "full purple": 3 "purple": 3 light purple: 1 green was obtained, showing that two pairs of factors were again involved.

2032 NAGAO, S. & TAKAHASHI, M.

(Studies on rice hybridization. XV. On the genotype governing glume pigmentation in the glutinous rice variety Karasu).

Ikushugaku Zasshi/Japan. J. Breeding 1952 : 2 : 47-50. [Japanese].

In his investigations of the cross Karasu [Crow] x Shinriki [Divine Power], Yamaguchi inferred that the former variety has the genotype *SBR* and the latter *sbr*, where *S* is responsible for brown apiculus, *B* converts brown to purple, and *R* brings about the distribution of pigmentation over the entire glume. The authors crossed Karasu with Kuro [Black] glutinous rice, Ebisu [Barbarian], Norin 20 [Ministry of Agriculture and Forestry 20] and a strain of genetic constitution $C^a S_p^a R_p M$. From the segregation ratios obtained, it is inferred that the genotype of Karasu would better be represented as $C^a S_p R_p$ and Shinriki as $c S_p^a r p$, where *C* is a chromogene locus. S_p is a reducing locus, and R_p is responsible for the distribution of pigment over the entire glume.

2033 1903-1953. Vijftig jaren Landbouw-proefstation. (1903-1953. Fifty years Agricultural Experiment Station). Surinaam. Landb. 1953 : 1 : 225-75.

An historical survey of the work of the Surinam Agricultural Experiment Station is given, together with an account of measures undertaken to combat plant diseases and pests and a description of the territory's natural grassland vegetation. Progress has been made in breeding new strains of rice possessing the yield of Skrivimankoti, but with stiffer straw. Single-line selection, designed to exploit the hetero-

geneity of the variety Holland, has given strains combining high yield with uniform grain. Hybrids have been evolved with stiff straw and good quality grain.

2034 OSTENDORF, I. F. W.

The Agricultural Experiment Station in Suriname.

Phyton 1953 : 3 : 47-51.

An account of the breeding of rice and other crops conducted during the past 50 years at the Experiment Station in Surinam is given (cf. Abst. 2033).

2035 NAGAMATSU, T. & TAKAHARA, K.

(An instance in which new types of rice were produced by the bulk breeding method from a cross between a Japanese type and an Indian type).

Ikushugaku Zasshi/Japan. J. Breeding 1953 : 2 : 230-32. [Japanese].

The F_1 hybrid between Murasakimuyozetsu [Purple Liguleless], a *japonica* type, and Koketsu [Red Blood] glutinous rice, an *indica* type, was vigorous but fertility was low. By growing bulk progenies in a relatively small area up to the F_6 , fertility was restored and constant lines were obtained showing various combinations of the original parental characters.

2036 BROWN, F. B.

Hybrid vigour in rice.

Malay. agric. J. 1953 : 36 : 226-36.

Comparisons between the parents and hybrids of 28 crosses for height, number of tillers, yield, sowing to flowering time, maturation period and grain weight were made. Only in the number of tillers and in yield was hybrid vigour significantly manifested. The female parent did not seem to have a special influence on the appearance of the F_1 .

2037 RICHHARIA, R. H. & JONES, L.

Mutation in paddy, *Oryza sativa*.

Proc. Bihar Acad. agric. Sci. 1953-54 : 2-3 : 140-41.

An enlarged outer glume mutant and a parrot-beaked (inner glume) sterile mutant occurred in a strain, isolated from CH 10 at Patna. The first mutant bred true; the second mutant set no good grain and attempts to cross it with CH 10 did not succeed.

2038 MORINAGA, T.

(What is the mode of inheritance of autotetraploid plants?).

Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 348-55. [Japanese].

After a preliminary discussion on the genetics of tetraploids, data are provided on the mode of

inheritance of pigmentation of the glume apex in crosses between an autotetraploid rice strain with purple glume apices and four autotetraploid strains with colourless glumes. The F_2 segregation ratios approximated to the 20:8:1 relation which would be expected for chromatid segregation. The F_3 data were more suggestive of chromosome segregation.

- 2039 WADA, E.
(**Studies on the sensitivity to temperature and to illumination of rice. I. On the sensitivity to temperature and to illumination of Japanese rice varieties and their geographical distribution**).
Ikushugaku Zasshi/Japan. J. Breeding 1952 : 2 : 55-62. [Japanese].

The reaction of 134 varieties to 8-hour photoperiods and to high greenhouse temperatures was investigated at the Konosu Experimental Station. The varieties could be classified into two groups: (1) forms in which heading was accelerated by high temperature but little affected by short photoperiods, and (2) forms in which the inverse relationship held. Varieties sensitive to high temperature tended to come from northern Japan; those affected by photoperiod tended to come from the south.

- 2040 OKA, H.
(**The mechanism of sterility in inter-varietal hybrids of cultivated rice. Phylogenetic differentiation of cultivated rice. VI**).
Ikushugaku Zasshi/Japan. J. Breeding 1953 : 2 : 217-24. [Japanese].

A study of hybrid semisterility due to gamete degeneration was made, utilizing the Philippine varieties Garumbalay and Malagkit sinaguig and the Japanese glutinous variety Kinoshita. The F_1 hybrid of Garumbalay x Kinoshita was semisterile; the other combinations were fertile. In the progeny of Kinoshita x F_1 (Garumbalay x Malagkit sinaguig), fertile and semisterile plants segregated in an approximate 1:1 ratio and an association was noted between fertility and glutinous homozygotes. These data and the segregation ratios observed in the progeny of Kinoshita crossed with the F_2 of the hybrid between the two Philippine varieties suggest that semisterility is caused by the complementary action of two gene pairs X_1x_1 and X_2x_2 , the double recessive bringing about degeneration, and by a further pair of factors, Y_1y_1 and Y_2y_2 , similar in their action to the foregoing. Linkage is believed to subsist between X_1 , Y_1 and g (glutinous grain).

- 2041 SYAKUDO [SHAKUDO], K., KAWASE, T. & NAKAO, T.
(**Studies on quantitative inheritance. X. A. Rice. C. Studies on the inheritance and quantitative function of the genes determining the size of the unhulled grains. 2. On the quantitative function of genes Gr_3 and D_1**).
Ikushugaku Zasshi/Japan. J. Breeding 1953 : 2 : 193-200. [Japanese].

Further to their paper on the inheritance of quantitative characters in the cross Nabeshima ($Gr_3Gr_3D_1D_1$) x an improved strain of Daikoku ($gr_3gr_3d_1d_1$), summarized in Abst. 1129, the authors analyse the effects of Gr_3gr_3 and D_1d_1 on the dimensions of the grain. The action of these genes is multiplicative to that of the gene complex C , defined in the authors' earlier papers. Gr_3 is incompletely dominant and increases grain length and diameter; D_1 is completely dominant and increases grain length but causes a reduction in diameter.

- 2042 VASCONCELLOS, J. DE C. E
O arroz (Estudo botânico). [**Rice (A botanical study)**].
Comiss. Regul. Comérc. Arroz, Lisboa 1953 : Pp. 301.

The present monograph integrates and somewhat elaborates those referred to in *PBA*, Vol. X, Abst. 447, Vol. XIX, Abst. 993 and Vol. XXIII, Abst. 2699 and certain other works on related subjects. Descriptions and illustrations are given of the organs and characters on which the classification is based. The classification itself has been extended to cover all known botanical varieties of *Oryza sativa* L., which is divided into four subspecies *indica* (= *sativa*), *japonica*, *brevindica* and *brevis*, and a certain number of varieties not included in previous issues, particularly Italian varieties, have been added. Data on percentages under cultivation show that certain varieties such as Chinês [Chinese] have become less popular and others such as Ponta Rubra [Red Tip] have gained in popularity.

- 2043 VAN DER VECHT, J.
The problem of the mentek disease of rice in Java.
Landbouw, Bogor 1953 : 25 : 45-130; also Contr. gen. agric. Res. Sta. Bogor 1953 : No. 137 : Pp. 88.

An account of the mentek disease, attributed to a combination of physiological causes, soil and climatic conditions and attack by the nematode *Radopholus oryzae*, is given and differences in

varietal reaction are noted. The variety Untung and some selections from the cross Tjina x Lati sail have shown a high degree of resistance to the disease.

2044 MENDIOLA, N. B.

A suggestion for combined general selection by gravity method and disinfection of rice seeds in the Philippines.

Araneta J. Agric. 1953 : 1 : 45-49.

Philippine rice varieties resistant to the following diseases are mentioned: *Helminthosporium oryzae*, *Piricularia oryzae*, *Sclerotium rolfsii*, *S. spheeroides*, *Gibberella fujikuroi*, *Leptosphaeria salvinii*, *Tilletia horrida*, *Ustilaginoides virens*, *Cercospora oryzae*, palay lalake (*Fusarium* sp.) and an unidentified *Sclerotium* disease.

2045 KOYAMA, T.

(Breeding varieties highly resistant to blast by hybridizing foreign varieties of the japonica type with Japanese rice).

Ikushugaku Zasshi/Japan. J. Breeding 1952 : 2 : 25-30. [Japanese].

Four *japonica* varieties introduced into Japan, namely Reishiko, To, Chinkeishu and Yakei nonglutinous rice, were found to be resistant to blast. By crossing Reishiko and To, both Chinese varieties, with two commercial Japanese forms, Norin 10 [Ministry of Agriculture and Forestry 10] and Ginbozu, and selecting for several generations, the following blast-resistant varieties were obtained: Kanto [Eastern Provinces] 51 and 52, from Ginbozu x To; and Kanto 53, 54 and 55, from Norin 10 x Reishiko.

2046 JIA LAL RAINA

Agricultural work in Jammu and Kashmir.

Indian Fmg 1953 : 3 : No. 9 : 24-25.

The high yielding paddy variety, China 1039, is free from the shedding defect common to most high yielding Chinese varieties and is resistant to diseases. So far good results have also been obtained in trials from USA 729 and Russian 3073, 1331 and 566, which will all mature at 7300 feet. Trials are in progress to select flood-resistant varieties.

2047 BROWN, F. B.

Varietal extension trials with wet padi, 1952-53.

Malay. agric. J. 1953 : 36 : 218-25.

Seri Raja gave significantly higher average yields than local varieties in the Bagan Serai and Biah districts of South Krian, Perak, and a slightly higher yield in the Semanggol district. In the Central West coastal region of Malacca

and in the Jasin district, respectively, Re Yong 6 and Serendah Kuning significantly outyielded local varieties. Re Yong 6 also seemed superior in the Central East district.

FORAGE GRASSES

2048 WEIR, J. R.

Breeding forage crops.

Ann. Rep. Canad. Seed Gr. Ass. 1952-53 (1953) : 29-32.

The application of inbreeding, hybridization, mass selection, strain building and polyploidy to improving forage crops is discussed.

2049 JONES, E. T.

Investigaciones para la mejora de hierbas pratenses. (Investigations on the improvement of pasture plants).

Rev. Inst. agric. catal. 1953 : 102 : 250-52.

A brief review in Spanish of the work of the Aberystwyth research station in breeding forage grasses and legumes is given.

2050 JULÉN, G.

Högaktuella Svalöfsstammar av slåtter- och betesvallväxter. (Highly important Svalöf strains of hay and pasture plants).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 17-20.

The varieties discussed with particular reference to their suitability for various parts of Sweden include the following, already mentioned in *Plant Breeding Abstracts*: the red clovers Merkur, Silo and the tetraploid Sv 034 and the tetraploid Alsike clover Sv 0205; Omnia and Bottnia timothy; the smooth-stalked meadow grass varieties Skandia II and Fylking and the new Jätteängsgröe [Giant smooth-stalked meadow grass], the name by which Sv 01610 is now known; and the meadow fescues Svalöfs sena [Svalöf Late] and Bottnia (cf. Absts. 1146 and 1148).

A new cocksfoot, Frode (Sv 01008), in which stem elongation and panicle production is late, is characterized by leafiness, fine stems, high yield and vigorous aftergrowth. As compared with its performance at Svalöf, it did not quite equal Brage in yield at Kalmar and Linköping, but it may be grown also in those parts with advantage.

A new meadow fescue strain Sv 01206, which has done well as a pasture grass in all districts and should soon be on sale, is derived from wild material from Östergötland. It is very late and produces a vigorous and abundant aftergrowth

in summer, thus compensating for its relatively low first cut (cf. Abst. 1155).

2051 The new lawn grasses. Their value in lawn seed mixtures.

Seed World 1954 : 74 : No. 1 : 8, 40-43.

The following turf-grass strains, which have shown promise in trials in the United States, are described: the blue grasses Merion (cf. *PBA*, Vol. XXII, Abst. 434) and Delta; a new strain of creeping fescue, not yet named, developed by crossing three selections; the red fescues Illahee (cf. *PBA*, Vol. XXI, Abst. 2716) and Trinity; the tall meadow fescues Alta and Kentucky 31; a polycross creeping bent; selections of the colonial type of bent; strains of Bermuda grass, including U-3, Gene Tift, Tiffine and Tiflawn (cf. Abst. 2065); and Meyer, a selection of *Zoysia japonica* (cf. *PBA*, Vol. XXII, Abst. 1980).

2052 ZÜRN, F.

Die Grünlandwirtschaft in den USA. (**Grassland husbandry in the USA**). Bundesanstalt für Alpine Landwirtschaft Admont und Österreichisches Produktivitäts-Zentrum Wien 1953 : Pp. 56. [Mimeographed].

This report of a study tour of the USA in 1952 includes an account of breeding work on pasture crops at different centres in the northern States. Of the grasses, *Bromus inermis* and *Phleum pratense* are receiving most attention by breeders. An account of the introduction of foreign varieties of lucerne into the USA is given; in this crop, special attention has been paid to breeding for resistance to wilt and frost.

2053 LACKAMP, J. W.

Veredeling op voederwaarde. (**Breeding for fodder value**).

"Wetenschap voor de praktijk." Meet. 27-28 Jan. 1954 VeevoedVraagstuk. Aanverw. Probl. Utrecht 1954 : 9-11.

It is suggested that, in the breeding of forage plants in the Netherlands, too much attention is being paid to increasing the protein content. The main objectives should be higher yield and better disease resistance.

2054 Working party on Mediterranean pasture and fodder development. Progress report on co-operative research program, October, 1953.

Circ. FAO UN 1953 : No. 3/1953 : Pp. 6. (Mimeographed).

Species, varieties and strains of herbage and fodder plants obtained from many sources have been sent to the Uniform Mediterranean

Nurseries in countries in Europe, N. Africa and Asia Minor for observation and for carrying promising types into seed production for larger trials.

Trials in Israel have indicated that some recent American varieties of sorghum are superior to local types.

2055 TAKIZAWA, S.

(**Multivalent chromosome configurations and aneuploidy in forage grasses**).

Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 446-53. [Japanese].

The frequency of multiple associations was determined in *Dactylis glomerata* ($4x$ and $4x + 1$), *Festuca elatior* ($2x$ and $6x$), *Lolium perenne* ($2x$), *Arrhenatherum elatius* ($4x$), *Trisetum pratense* ($4x + 1$), *Alopecurus agrestis* ($2x$), *A. geniculatus* ($4x$), *A. pratensis* ($4x$ and $4x + 1$), and *Phleum pratense* ($6x$), where $x = 7$. The differences between euploid and aneuploid strains were slight. Multiple associations were found in all the $4x$ and $6x$ strains, also in $2x$ *Lolium perenne* and $2x$ *Festuca elatior*; it is concluded that $x = 7$ is not the primary basic number of these grasses.

2056 MANNER, R.

Några erfarenheter rörande återväxtförmågan hos våra vanligaste vallväxtarter och stammar. (**Some experiences bearing on the capacity for aftermath production in our most common meadow plants and strains**). Medd. Gullåsk. VäxtförädlAnst. 1952 : No. 9-10 : 219-24.

Aftermath growth in red clover, Alsike clover, blue lucerne and various meadow grasses is compared. Swedish strains of red clovers and certain grasses are discussed from the same standpoint. Among the red clovers, Hammenhög Essi was slightly superior in aftermath production to the Danish strain Hjelm [Helmet] and Hammenhög Vanadis was the best of the timothy strains. Svalöfs Sena [Svalöf Late] ranked first in the meadow fescues.

2057 REEDER, J. R. & VON MALTZAHN, K.

(**Taxonomic significance of root-hair development in the Gramineae**).

Proc. nat. Acad. Sci., Wash. 1953 : 39 : 593-98.

Sinnott and Bloch have previously suggested that the Festucoideae and Panicoideae have different types of root-hair development. Studies of additional genera by the present authors have confirmed the taxonomic significance of type of root-hair development and have shown

that differences in the structure of the embryo, leaf anatomy, and chromosome size and number also separate the two subfamilies. Anatomical and cytological characters apparently give more certain clues to the true affinities of genera than the gross morphological features usually studied.

2058 WEINTRAUB, F. C.

Grasses introduced into the United States.

Agric. Handb. US Dep. Agric. 1953 : No. 58 : Pp. 79.

A list of introduced grass species already found economically valuable in the United States or believed to be promising is presented. In many cases information on origin, distribution, characteristics and usage is given. A bibliography arranged according to specific names and an index of common names are also provided.

2059 LEFEBVRE, C. L., HOWARD, F. L. & GRAU, F. V.

How to keep turf grass healthy.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 285-91.

The resistance to the commonest diseases of the main bent grasses grown in the USA is mentioned. Descriptions are given of Merion bluegrass, U-3 Bermuda grass and Meyer (Z-52) zoysia (cf. Abst. 2051).

2060 KATO, Y.

(Meiotic and mitotic irregularities in *Poa*).

Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 342-47. [Japanese].

Cytological investigations of *P. compressa* ($2n = 42$ and $42 + 2$ ff), *P. nemoralis* ($2n = 42$ and ± 49) and *P. pratensis* ($2n = 42, 49, 49 + 2$ ff, and 56) are reported, and data are given on the frequency of univalents and chromatin bridges.

2061 BRIX, K. & QUADT, F.

Experimentell genetische Untersuchungen über die Natur einer natürlichen Polyploidien (*Dactylis glomerata*). [Experimental genetical investigations on the nature of a natural polyploid (*D. glomerata*)].

Z. Pflanzenz. 1953 : 32 : 407-20.

Experiments were made to determine whether the natural polyploid *D. glomerata* is an autopolyploid or an allopolyploid, using the recessive gene *g* for chlorophyll deficiency as a marker in selfings and cross pollinations. *G* showed incomplete dominance over *g*; the fully recessive chlorophyll-deficient genotype was lethal. Segregation in the F_2 and F_3 excluded the

possibility of allopolyploidy and showed *D. glomerata* to be an autotetraploid.

2062 KELLER, W.

Water requirement of selected genotypes of orchardgrass, *Dactylis glomerata* L.

Agron. J. 1953 : 45 : 622-25.

Plants representing sixteen genotypes were grown in soil in gallon cans for a period of 66 days. The genotypes differed significantly with respect to the weight of total water used (*X*), yield of dry matter (*Y*) and water requirement (*X/Y*) per plant. Genotypes high in dry-matter yield were low in water requirement and *vice versa*.

2063 BRADSHAW, A. D.

Local population differentiation in *Agrostis tenuis*.

Heredity 1953 : 7 : p. 445. (Abst.).

Samples from natural populations of *A. tenuis* occurring in a small geographical region in the neighbourhood of Aberystwyth, N. Wales, were grown together in an experimental plot for several years. The populations showed a considerable amount of differentiation, the population of any one area apparently being adapted to the particular environmental conditions in question. Provided that the environments were markedly distinct, even populations only 100 yards apart were differentiated. Recent work by other investigators has suggested that under such conditions the expected amount of cross pollination would be as low as 5%. This degree of gene flow would easily be counteracted by natural selection.

2064 KREITLOW, K. W.

The northern forage grasses.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 262-67.

Some of the recent American varieties of *Phleum pratense* have resistance to leaf spot diseases, and Merion, a variety of *Poa pratensis* (cf. Abst. 2051), has considerable resistance to *Helminthosporium vagans*.

2065 HEIN, M. A.

Registration of varieties and strains of Bermuda grass, II. (*Cynodon dactylon* (L.) Pers.).

Agron. J. 1953 : 45 : 572-73.

The varieties Midland, Tiffine and Tiflawn have been approved for registration in the United States. Midland is the vegetative increase of an F_1 hybrid plant from a cross between a local strain from Indiana and Coastal Bermuda (cf. *PBA*, Vol. XVIII, Abst. 243). It is more productive than common Bermuda and is

resistant to drought, low temperature and disease; its palatability is good. Tiflawn, a turf type, is a hybrid between two selections. Tiffine, another turf type, is a hybrid between Tiflawn and *C. transvaalensis*. All three varieties were developed at the Georgia Coastal Plain Experimental Station, Tifton, in cooperation with the US Department of Agriculture.

2066 New grass for golf courses.

What's New Crops Soils 1953 : 6 : No. 3 : p. 23.

Tiffine, an improved variety of Bermuda grass, developed by the Coastal Plain Experiment Station, Tifton, Ga. is aggressive, disease resistant, uninjured by overseeding with ryegrass, and finer in texture than other types of Bermuda grass. It is propagated vegetatively.

**2067 BURTON, G. W. & DE VANE, E. H.
Suwanee Bermuda grass for deep sands. New grass shows promise for problem soils.**

Seed World 1953 : 73 : No. 6 : p. 49.

Suwanee was bred specifically for growing in Georgia on deep sands at moderately low levels of fertility (cf. Abst. 1150). On other types of soils Coastal Bermuda (cf. *PBA*, Vol. XVIII, Abst. 243) is superior to Suwanee.

2068 Southland brome grass expected to be available following 1954 harvest.

What's New Crops Soils 1953 : 6 : No. 3 : p. 21.

Compared with other southern strains of brome grass, the variety Southland, announced by the Oklahoma Agricultural Experiment Station, is reported to be superior in yield, seedling vigour and resistance to leaf rusts (cf. *PBA*, Vol. XXIV, Abst. 1153).

2069 WALTERS, M. S.

Radiomimetic chromosome aberrations in species and interspecific hybrids of *Bromus*.

Genetics 1953 : 38 : p. 700. (Abst.).

The following phenomena have been observed in species and interspecific hybrids of *Bromus*: chromosome breakage and reunion; centromere division; chromosome erosion; abnormal chromosome coiling; pseudobivalents at metaphase I; difficulty of separation at anaphase I; and chromosome stickiness. A changed environment or, in the case of the hybrids, intergenomic reactions may be responsible for these radiomimetic effects. It is further suggested that chromosomes may respond in similar ways to many different stimuli.

2070 NIELSEN, E. L.

Some cytological behaviors related to sterility in *Bromus inermis*.

Amer. J. Bot. 1953 : 40 : 824-27.

In sterile plants from nine different sources the early development of the female gametophyte resembled that observed in normal fertile individuals. At the binucleate and subsequent stages, however, the female gametophyte showed a considerable reduction in size. Eventual collapse was preceded by an early digestion of the nutrients of the antipodals and degeneration of the egg apparatus.

2071 FISCHER, G. W.

Smuts that parasitize grasses.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 280-84.

A new strain of *Ustilago bullata* that attacked the formerly resistant mountain brome variety Bromar is mentioned (cf. *PBA*, Vol. XXIII, Abst. 393).

2072 JONES, L. I.

Preliminary note on S.22 Italian ryegrass.

J. Brit. Grassl. Soc. 1953 : 8 : 345-48.

On the basis of the results of trials conducted during the period 1949-53 at the Welsh Plant Breeding Station, Aberystwyth, S.22 is compared with New Zealand Short Rotation ryegrass and Irish Italian ryegrass, with respect to herbage production for grazing and drying, growth habit, appearance in winter and early spring, disease resistance and persistency.

2073 CROWDER, L. V.

Interspecific and intergeneric hybrids of *Festuca* and *Lolium*.

J. Hered. 1953 : 44 : 195-203.

F. elatior, *F. arundinacea*, *L. perenne*, *L. multiflorum* and *L. multiflorum* var. *diminutum* were crossed reciprocally in all combinations. Most of the hybrid caryopses collapsed but some of the excised embryos produced seedlings. Only hybrids involving *F. arundinacea* flowered. All these had 28 somatic chromosomes. Both autotetraploidy and allopolyploidy occurred in respect of *F. arundinacea* chromosomes. The anthers did not dehisce and attempts at backcrossing were not successful.

2074 PARODI, L. R.

Las especies de *Festuca* de la Patagonia. (The species of *Festuca* in Patagonia).

Rev. argent. Agron. 1953 : 20 : 177-229.

A list is given of species that have to be excluded from the genus since they belong to *Poa* or

other genera; 16 species remain and are described; two of them, *F. cabreræ* and *F. longidiurna*, are new species, and six are indicated as useful for forage purposes, *P. pallescens* being particularly mentioned in respect of its resistance to grazing and tolerance of arid conditions.

2075 VILLAR, A. D.

"Oliveros Paraná M.A.G.", nueva variedad de sorgo del Sudán. (**Oliveros Paraná MAG, a new variety of Sudan grass**).

Idia 1953 : No. 68 : 24-25.

The variety described arose from selection work initiated at the experimental station at Oliveros, Argentina, in 1946. It is superior to the strain now in cultivation in respect of both quality and yield of green fodder, tillering capacity and recovery after cutting and grazing; in toxicity it does not differ from the strain now grown.

2076 THURMAN, R. L., STATEN, R. D. & BURDICK, A. B.

New research on silage and forage crops.

Arkans. Fm. Res. 1953 : 2 : No. 4 : p. 1.

Yields of sorghum varieties, maize and soya beans grown as pure and mixed silage crops are given. Atlas and Orange were the first sorghum varieties to reach maturity.

Tift and Piper Sudan grass varieties recovered rapidly after cutting, ranked high in production, disease resistance and lodging resistance, and were relatively low in prussic acid.

Both were green and erect at the end of the season.

2077 HARDISON, J. R.

Leaf diseases of range grasses.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 253-58.

The Kaw strain of *Andropogon gerardi*, released by Kansas State College, is mentioned as relatively free from disease.

2078 ARDAŠEV, M.

(High-yielding varieties of Sudan grass).

Kolhoznoe Proizvodstvo (Collective Farming) 1954 : No. 2 : p. 44. [Russian].

Descriptions are given of the drought-resistant varieties Brody 2, Kinelj 90 and Odessa 25, which give two good cuts of hay under Baškiran conditions. Brody 2 and Kinelj 90 produce more seed and are earlier than Odessa 25, but the latter yields more green substance and hay.

2079 **New Sudangrass resists leaf blight.**

Seed World 1953 : 73 : No. 11 : p. 14.

The variety Greenleaf, seed of which is to be distributed in Kansas in 1954, is mentioned. It

has the advantages of resistance to *Helminthosporium* blight, leafiness, sweet stalks and low content of prussic acid.

2080 HEIN, M. A.

Registration of varieties and strains of pearl millet (*Pennisetum glaucum* (L.) R. Br.).

Agron. J. 1953 : 45 : 573-74.

The synthetic variety Starr, recently approved for registration in the United States, is described (cf. *PBA*, Vol. XXI, Abst. 1898).

2081 WARMKE, H. E.

Apomixis in *Panicum maximum*.

Amer. J. Bot. 1954 : 41 : 5-11.

The paper provides a detailed and illustrated report of cytological studies which have shown that this species is a facultative apomict, undergoing both apospory and pseudogamy (cf. Abst. 1142). Progeny tests of two varieties indicated that 1.3 to 4.7% of the offspring were probably sexual, as shown by their lack of uniformity in morphological and other characters.

2082 HUTTON, E. M.

Production of allopolyploids in *Phalaris* by a modified colchicine technique.

J. Aust. Inst. agric. Sci. 1953 : 19 : 244-47.

F₁ hybrids of *Ph. tuberosa* x *Ph. minor* and *Ph. caerulea* x *Ph. minor* were cut back daily and treated with colchicine until the new growth was retarded. Allopolyploid seed of *Ph. tuberosa* x *Ph. minor* gave plants showing desirable characteristics of both parents. Spontaneous allopolyploidy arose in the F₁ *Ph. tuberosa* x *Ph. minor*. Further trials are needed to discover the degree of perenniality and recovery after grazing.

2083 BJÖRKMÄN, S. O.

Chromosome studies in *Agrostis*. II.

Hereditas, Lund 1954 : 40 : 254-58. (Abst.).

Further data on the sect. *Trichodium* are given (cf. *PBA* Vol. XXI, Abst. 2723); information on some species of sect. *Vilfa* is also provided. The subdivision of *A. canina* into vars. *fascicularis* (2n = 14) and *arida* (2n = 28) was found to be valid for specimens from northern, western and central Europe. Pentaploids also occurred in four populations of var. *arida* from northern Sweden. One type of *A. canina* from northern Spain had 2n = 42; other biotypes from Portugal had 2n = 56. *A. nevadensis* was characterized by 2n = 42 + 2 to 10 supernumeraries. Pyrenean material of *A. rupestris*

had $2n = 14$ or 28 , samples from the Alps $2n = 28$. *A. stolonifera* was represented by three races, with $2n = 28, 35$ and 42 , respectively. *A. rupestris* x *A. schraderiana*, believed to have been erroneously classified as *A. borealis* var. *sabauda* (= *A. rubra*) by Chouard, had $2n = 21$ or 28 . The somatic chromosome numbers of *A. schraderiana* and *A. borealis* were found to be 28 and 56 , respectively. *A. tenuis* possessed $2n = 28$ in most cases; some plants contained supernumeraries. Other $2n$ numbers reported are as follows: *A. gigantea*, 42 , and $42 + 4$ supernumeraries; *A. castellana*, 28 , and $28 + 1, 2$ or 3 supernumeraries; *A. reuteri*, 14 ; *Polypogon semiverticillatus* (= *A. verticillata*), 28 ; and *P. fugax* (= *P. littoralis*), 42 .

2084 BOWDEN, W. M.

Cytotaxonomic and genetic studies in the genus *Elymus*, section *Psammelymus*.

Genetics 1953 : 38 : 656-57. (Abst.).

Collections of *E. mollis* from Canada, Iceland, Greenland, Alaska and Japan were all found to be tetraploid ($2n = 28$). Accessions of *E. arenarius* from Europe had $2n = 56$. Both tetraploid and octoploid representatives of *E. giganteus* have been identified. The three species appear to have originated from an ancestral population in Asia. The Eurasian species *E. arenarius* is probably more closely related to the Asiatic *E. giganteus* than to *E. mollis* from the North Pacific and North American regions.

2085 CONNOR, H. E.

Studies in New Zealand *Agropyron*. Pts. I and II.

N.Z. J. Sci. Tech. 1954 : 35 : 315-43.

Part I presents descriptions of the aggregate species *A. scabrum* ($2n = 28$), and three other indigenous species, *A. enysii* ($2n = 28$), *A. kirkii* ($2n = 42$) and *A. tenue* (= *A. scabrum* var. *tenue*) with $2n = 56$. Possible interspecific relationships are discussed. The characteristics of infraspecific units within *A. scabrum* are described, together with information on geographical distribution. Part II is concerned with breeding systems. On the basis of observations and experiments on flowering habit, self fertilization, the effects of inbreeding, attempted cross fertilization without emasculation, spontaneous interspecific and intraspecific hybridization, and sympatric distribution of infraspecific units, the following conclusions are reached: self fertilization is the normal method of reproduction in sexual groups of

A. scabrum; *A. kirkii* is an allogamous species with high seed-setting ability when selfed; and *A. enysii* and *A. tenue* are at least facultatively autogamous.

LEGUMINOUS FORAGE PLANTS

2086 SAKAI, B.

(Caryotype analysis of Leguminous plants. I).

Senshokutai (Chromosome)/Kromosomo 1951 : No. 11 : 425-29. [Japanese].

Caryotypes of the following species are described and illustrated: *Albizia julibrissin*, *Caesalpinia japonica*, *Glycine soja*, *Kummerowia striata*, *Lathyrus japonicus*, *L. odoratus*, *L. tingitanus*, *Lespedeza pilosa*, *Pueraria thunbergiana*, *Rhynchosia volubilis* and *Vicia sativa*.

2087 LECHNER, L.

Ergebnisse der Hülsenfrucht-Importsaatversuche 1952 an der Bayerischen Landessaatzuchtanstalt Weißenstephan bei Freising/Obb. (Results of the 1952 trials of imported legume seed at the Bavarian State Seed Breeding Institute, Weißenstephan near Freising/Obb).

Saatgutwirtschaft 1954 : 6 : 37-39.

German and foreign leguminous forage varieties are compared as to total yield and dry matter and protein contents. In the main, the German varieties proved superior.

2088 WEIMER, J. L. & ALLISON, J. L.

Legumes in the south.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 248-53.

Varieties of leguminous plants resistant and susceptible to the principal diseases affecting them are mentioned.

2089 BOLTON, J. L. & CORMACK, M. W.

Breeding alfalfa in Canada.

Emp. J. exp. Agric. 1953 : 21 : 241-54.

Lucerne breeding in Canada is surveyed under the following headings: (1) organization of projects; (2) progress so far achieved in improving winter hardiness, forage yield, seed yield, resistance to diseases, drought tolerance, resistance to grazing and tolerance of acid soils; (3) methods of selection based on direct testing of clones combined with progeny trials; (4) special techniques, comprising screening for disease resistance, isolation plots, methods of shortening the time required to produce a new generation, asexual propagation, crossing and selfing, and yield determination; and (5) methods of breeding with reference to mass

selection, maternal-line selection, synthetics and the possible value of commercial hybrids.

2090 BATTLE, W. R.

Atlantic alfalfa.

Bull. NJ agric. Exp. Sta. 1952 : No. 765 : unpaginated.

Atlantic (cf. *PBA*, Vol. XV, Abst. 645) was developed for New Jersey but is widely adaptable. Plants vary from dark to light green and may have erect to almost prostrate growth. The variety has considerable resistance to the insects and diseases in the eastern United States and is fairly tolerant of bacterial wilt. Results of trials of 10 varieties carried out over 5 years are given. Atlantic gave the highest yields, showed the greatest persistence and was among those with least injury from leaf spot diseases.

2091 ERDMAN, L. W. & MEANS, U. M.

Strain variation of *Rhizobium meliloti* on three varieties of *Medicago sativa*.

Agron. J. 1953 : 45 : 625-29.

Experiments on the effects of 21 strains of *Rh. meliloti* upon the lucerne varieties Buffalo, Narragansett and Du Puits revealed significant strain x variety interactions.

2092 OLDMEYER, R. K. & BRINK, R. A.

Effect on fertility at the tetraploid level of the genome derived from diploid *Medicago falcata*.

Agron. J. 1953 : 45 : 598-600.

Cross-pollinated F_1 hybrids between *M. media* 'Cossack' and colchicine-induced tetraploids of *M. falcata* showed no reduction in seed set, compared with the control plants of Cossack. A similar level of seed fertility was maintained when F_1 hybrids were back-crossed to either parent. The haploid complement of chromosomes ($n = 8$) in *M. falcata* may therefore be substituted for one of the two homologous sets in *M. media* ($n = 16$) without impairing seed fertility. This result provides support for the view that cultivated lucerne had an autotetraploid origin. Cross-pollinated autotetraploid *M. falcata* was distinctly less fertile than the control plants of Cossack. Self pollination of the F_1 hybrids reduced both pollen quality and seed-setting capacity in the F_2 ; this inbreeding effect was of the same order as that observed in the case of self-fertilized *M. media*.

2093 PEDERSEN, M. W. & BOHART, G. E.

Factors responsible for the attractiveness of various clones of alfalfa to pollen-collecting bumble bees.

Agron. J. 1953 : 45 : 548-51.

In experiments carried out at Logan, Utah,

certain lucerne clones were more attractive to bumble bees (*Bombus morrisoni*) than others, the attractiveness being inherited.

2094 ZALESKI, A.

Lucerne investigation. I. Identification and classification of lucerne 'varieties' and 'strains'.

J. agric. Sci. 1954 : 44 : 199-220.

During the period 1949-52, at the National Institute of Agricultural Botany, Cambridge, England, detailed investigations were carried out on some morphological and physiological characters of a large number of lucerne-varieties sown in row plots and on 12 typical varieties planted in replicated trials of single-spaced plants. Three bases of classification were found to be adequate; (1) spring growth, autumn growth and time of flowering; (2) length and width of the leaflet; and (3) growth habit and flower colour. The first classification, grouping varieties into early, midseason, late and extra-late types, serves as a fairly satisfactory guide for the grower. The close correlation established between spring growth and time of flowering permits reliance upon the former character, readily estimated in row plots, as a diagnostic feature. This classification can only be applied to the country in which it was established. Classifications (2) and (3) may prove to be fairly satisfactory for an international classification. From the data on the 12 typical varieties studied as single-spaced plants, some close correlations between the different characters were established. Whichever classification is used, other characters can be employed to identify varieties within a type.

Introductions from countries of extremely mild climate or varieties normally grown under irrigated conditions showed a low degree of persistency.

2095 WILSIE, C. P.

Better alfalfas available.

Iowa Fm Sci. 1954 : 8 : No. 9 : 7-8.

Modern methods of mass producing certified seed are mentioned and the varieties Ranger, Buffalo, Atlantic and Vernal are briefly described and recommended for Iowa.

2096 JONES, F. R. & SMITH, O. F.

Sources of healthier alfalfa.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 228-37.

The diseases occurring on lucerne are described. Resistant varieties and breeding for resistance are discussed for most of the diseases mentioned.

2097 JONES, F. R.

Measurement of resistance in alfalfa to common leaf spot.

Pytopathology 1953 : 43 : 651-54.

A method of estimating resistance to *Pseudopeziza medicaginis* applicable to either the first unifoliate leaf of seedlings or to older cuttings is described. Three classes of resistance are recognized, based on the extent of growth of the fungus through the epidermis. In very resistant plants the fungus does not spread through the epidermis but penetrates directly into the mesophyll where it grows slowly without fruiting.

2098 ÅKERBERG, E. & JULÉN, G.

Nya erfarenheter rörande du Puits blålucern. (New findings concerning du Puits blue lucerne).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 15-17.

Recent information based on trials of the suitability of the above strain for various districts in Sweden is given, with notes on its performance, as compared with Grimm, Ile de France and the Flamande-type strains, Chartainvilliers and W 268.

In southern Sweden, du Puits appears to be the best as regards yield, while in more northerly districts, e.g. Skara and Ultuna, it has not done so well and proved inferior to Grimm in resistance to spring frosts. It is recommended for Skåne and the adjacent coastal district and for Östergötland. It can also be grown in other regions in short leys, but where the ley exceeds two years Grimm is to be preferred.

2099 LAUMONT, P. & L'HERMITE, M.

Note sur la luzerne arborescente (*Medicago arborea* L.). (Note on *M. arborea* L.).

Ann. Inst. agric. Algér. 1953 : 7 : No. 7 : Pp. 11.

A botanical description is given of *M. arborea*, with observations on its floral biology. Clonal selection of promising types has already been begun at the Maison-Carrée Station for the Breeding of Crop Plants in Algeria.

2100 KEIM, W. F.

Interspecific hybridization in *Trifolium* utilizing embryo culture techniques.

Agron. J. 1953 : 45 : 601-06.

Techniques have been developed for excising and culturing immature embryos of leguminous species (cf. Abst. 1178). By means of these techniques, normal plants from interspecific crosses of *Trifolium* spp. were obtained in the

initial studies. In subsequent experiments the techniques have been successfully applied to $2n$ *T. ambiguum* x $2n$ *T. hybridum*. Hybrids of $2n$ *T. repens* x $2n$ *T. nigrescens*, and reciprocal hybrids between colchicine-doubled forms of these two species have also been secured (cf. Abst. 1188). No hybrids were raised from other interspecific crosses involving *T. ambiguum*, or from *T. medium* x colchicine-induced $4n$ *T. pratense* and $2n$ *T. pratense* x $2n$ *T. alpestre* and the two reciprocal crosses.

2101 LATTER, B. D. H.

Physiologic races of subterranean clover rust.

J. Aust. Inst. agric. Sci. 1953 : 19 : 248-50.

Two races, A and B, of *Uromyces trifolii-subterranei* which differ in host range and distribution have been discovered in Australia. The subterranean clover varieties Mulwala, Wenigup and North are resistant to both races.

2102 HOLLOWELL, E. A.

Registration of varieties and strains of red clover, III.

Agron. J. 1953 : 45 : p. 574.

Information is given on the variety Pennscott, recently approved for registration in the United States (cf. PBA, Vol. XXII, Abst. 461).

2103 Undersökningar rörande insektspollinerade kulturväxter II. Studier över rödklövern fröbildning. Resultat från undersökningar, utförda under åren 1942-1952. (Investigations concerning insect-pollinated crop plants, II. Studies on seed production in red clover. Results of investigations carried out during 1942-52).

Medd. Sverig. Fröodlereförb. 1953 : No. 2 : Pp. 138.

This communication, issued by the Swedish Seed Growers' Union, is composed of reports by various authors on the following research on insect-pollinated crop plants: E. Åkerberg on red clover seed production in Sweden during the 20th century, the general biology of red clover and pollination, and seed production experiments with red clover in Svealand and southern Norrland; B. Schwan on insects pollinating red clover in 1942-46; T. Hasselrot on experiments in domesticating bumble bees; G. Julén on the relative set of seed, i.e. the number of seeds as compared with the number of florets in well-formed heads, in red clover, seed raising experiments in Götaland, and special problems of seed setting in tetraploid

red clover, with special reference to abnormalities of the embryo and their possible causes; K. Wiklund on seed production experiments with red clover strains in central and upper Norrland; B. Wahlin on insecticides and insect pollinators; E. Åkerberg and M. Hablin on the pollinating insects observed in red clover seed plots in 1949-52; R. Torssell on the origin and organization of the above research programme, and R. Torssell and E. Åkerberg on practical applications and future lines of investigation.

- 2104 GRAHAM, J. H. & HANSON, R. G.
Field inoculation of red clover with *Sclerotinia trifoliorum*.
Plant Dis. Repr. 1953 : 37 : 518-20.
(Mimeographed).

In investigations at the Pennsylvania State College, artificial field inoculation of red clover with *S. trifoliorum* was accomplished by scattering dried grain inoculum over the plants in autumn. Such a method makes possible the screening of large numbers of plants for resistance; the technique is now being used at the US Pasture Laboratory in the programme of Ladino clover breeding.

- 2105 SACHS, E.
Sorte und Futterbau. (**Variety and fodder growing**).
Mitt. dtsch. LandwGes. 1954 : 69 : 150-51.

Factors affecting the yield of forage crops are discussed and the importance of selecting the best adapted variety stressed. Of ten varieties of red clover tested at Weihenstephan, Lembke Hochzucht [Lembke Pedigree] proved the most resistant to anthracnose and gave the highest yield of hay. In comparative tests of German and American varieties of lucerne, the former proved superior in vigour and yield.

- 2106 **New Pilgrim Ladino.**
Seed World 1953 : 73 : No. 12 : p. 33.
An improved Ladino clover, Pilgrim, will be recommended for several northeastern states as it is more persistent than other Ladino clovers under those conditions. It is not possible to identify the seed by visual means alone.

- 2107 OYAMA, T. & IGUCHI, Y.
(**A case of sterility in white clover and its cause**).
Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 502-07. [Japanese].
Sterile plants were noted in a white clover type with ovate leaflets, termed OCrW^(gs), at Hakodate, Hokkaido. The sterile plants were both highly self sterile and cross sterile with a

variety R with round leaflets. Plants with similar behaviour were obtained by subjecting OCrW^(gs) to low temperature treatment. It is concluded that the sterility arose by mutation induced by low temperature and was not a consequence of incompatibility.

- 2108 FAVILLI, R.
Alcune ricerche ed osservazioni sopra il trifoglio "Ruffo di Calabria" (*Trifolium vesiculosum*, Savi). [**Some researches and observations on Ruffo di Calabria clover (*T. vesiculosum* Savi)**].
Ann. Fac. Agr. Pisa 1952 : 13 : 113-31.

This wild species, introduced into cultivation recently in southern Italy, proves more resistant to drought and poor soil conditions than most leguminous forage plants and a description of it is presented.

- 2109 GUINEA, E.
Estudio botánico de las vezas y arvejas españolas. (Monografía del género *Vicia* Linné en España). [**Botanical study of the Spanish vetches. (Monograph of the genus *Vicia* Linné in Spain)**].
Instituto Nacional de Investigaciones Agronómicas, Madrid 1953 : Pp. 227.

Full botanical descriptions are given of the many species of vetch occurring in Spain, with notes on methods of cultivating them and maps illustrating their geographical distribution.

- 2110 HANSON, C. H.
Inheritance of flower color, resistance to powdery mildew, and other characters in Korean lespedeza.
Agron. J. 1953 : 45 : 555-58.

After crossing several varieties of *Lespedeza stipulacea* at the North Carolina Agricultural Station, the F₂ indicated that flower colour, reaction to *Microsphaera diffusa*, growth habit of laterals and erectness of main stem were each conditioned by two or more gene pairs. Association was found between flower colour and date of first bloom; flower colour and reaction to *Microsphaera diffusa*; and date of first bloom and erectness of main stem.

- 2111 JOHNSON, I. J. & HOOVER, M. M. (Jun.)
Comparative performance of actual and predicted synthetic varieties in sweetclover.
Agron. J. 1953 : 45 : 595-98.

Four groups of plants were chosen, each consisting of S₁ lines from seven S₀ plants classified as low, medium low, medium high and high in general combining ability, as determined by open-pollinated progeny tests. S₁ lines within

each group were intercrossed by means of honey bees, to produce polycross seed. The mean polycross (Syn. 1) yields corresponded with gradings of the groups of S_1 lines for general combining ability. The agreement between the actual yields of the synthetics and yields predicted on the basis of the open-pollinated progeny performance of the S_0 plants was good. Variability among S_1 plants with respect to polycross performance was studied in the group with high combining ability. The S_1 plants within three of the seven lines differed significantly for polycross yields, suggesting that it might be advantageous to test for general combining ability among individual S_1 plants derived from S_0 plants with high combining ability. The correlations obtained indicated that the performance of open-pollinated progenies of S_0 plants and S_1 yields were of equal value for estimating the value of the S_0 plants for the production of synthetics.

- 2112 **Yellow sweetclovers free from coumarin are possibility, USDA Agronomist reports.**
What's New Crops Soils 1954 : 6 : No. 4 : p. 23.

Fertile hybrids between white sweet clover and yellow sweet clover have been produced at the Nebraska Agricultural Experiment Station. From these it is hoped to select plants combining freedom from coumarin with the more desirable agronomic characters of yellow sweet clover.

- 2113 JOHNSON, I. J. & GOFORTH, F.
Comparison of controlled mass selection and recurrent selection in sweetclover, *Melilotus officinalis*.
Agron. J. 1953 : 45 : 535-39.

Experiments conducted at the Iowa Agricultural Experimental Station showed that mass selection for lateness of flowering in Madrid sweet clover produced very small significant gains and increased susceptibility to winter injury. Mass selection improved combining ability but recurrent selection was more effective.

- 2114 HVATOVA, K. A.
(Using vernalization as the basis for selecting early forms of the annual lupin).

Agrobiologija (Agrobiology) 1953 : No. 4 : 136-38. [Russian].

Rannii Rozovyi [Early Pink], which does not always reach maturity in the Leningrad province, has been improved by selecting early plants grown from vernalized seed. Material obtained

by single or twofold selection is 4-5 days earlier and yields 14.4 c.-16.8 c. of seed per ha.

- 2115 WALLACE, A. T., HANSON, W. D. & DECKER, P.
Natural cross-pollination in blue and yellow lupines.
Agron. J. 1954 : 46 : 59-60.

Under conditions at Gainesville, Fla., natural cross pollination of bitter blue lupin (*Lupinus angustifolius*) occurred infrequently. In sweet yellow lupin (*L. luteus*), 8.2% and 2.6% cross pollination took place in nursery rows in tests during 1950 and 1951, respectively. An experiment with intermingled plants indicated that as much as 40% cross-pollination is possible with this type of planting.

- 2116 MANNER, R.
Den gula sötlupinen (*Lupinus luteus*) ökade alkaloidhalt och synpunkter på ökningens orsaker. **(The increased alkaloid content of the yellow sweet lupin (*L. luteus*) and views on the causes of the increase).**
Medd. Gullåker. VäxtförädlAnst. 1952 : No. 9-10 : 229-34.

A gradual increase having been observed in the percentage of bitter seeds in a sweet variety of *L. luteus* in a spatially isolated plot from 3.3 to 5 during 1949-51, hybridization tests were made at the Gullåker Plant Breeding Station, and cross pollination was found to amount to 22.9%. Cross pollination is known to give rise to bitter plants.

Statistical evidence is also advanced, suggesting that plants with a high alkaloid content set more seed and therefore reproduce faster than those with a low content.

By mass selection at the Gullåker Station, the proportion of bitter seeds in common yellow sweet lupin plots was reduced from 5% to 1% after the second elimination of bitter plants.

- 2117 RÜTHER, H.
Ertragssteigerungen beim Leguminosen-Anbau auf unseren leichten Böden.
(Increasing the yield of leguminous plants cultivated on our light soils).
Kühn-Archiv 1953 : 67 : 413-14.

Varieties of *Lupinus albus*, *L. luteus* and *Pisum arvense* suitable for cultivation on sandy soils in Eastern Germany are recommended. In trials at Bad Lauchstädt, the pea variety Ostsaat [East Seed] gave the highest yield. *L. albus* had a higher protein content than other lupin species.

- 2118 COUTINHO, L. A. & RIBEIRO, M. I. A.
Algumas observações cariológicas no
género *Scorpiurus* L. (Some caryo-
logical observations in the genus
Scorpiurus L.).

Rev. agron., Lisboa 1945 : 33 : 354-62.

In a study of the wild Portuguese species of interest as fodder plants, the chromosome number $2n = 14$ was established in *S. vermiculatus* var. *genuinus*, in which the morphology of the 7 individual chromosomes is described and illustrated. In *S. muricatus*, *S. subvillosus* and *S. sulcatus* $2n = 28$. The SAT chromosomes were 2 in number in all four species. The observations are not yet sufficiently complete to shed light on the phylogenetic relationships of the species.

- 2119 LOUIS-MARIE

Sur la culture du lotier (*Lotus corniculatus* L.). [On the cultivation of birdsfoot trefoil (*L. corniculatus* L.).
Rev. Oka 1953 : 27 : 169-71.]

Views on the cultivation of *L. corniculatus* expressed by R. Briggs during the author's visit to the New Jersey Experimental Farm are recorded, and brief notes are added on: (1) stem colour and its possible genetic basis; (2) cold resistance and climatic adaptation of European varieties; and (3) seed size as a hereditary character and its possible relation to (a) plant size and (b) germination capacity.

- 2120 DELMAS, H.-G.

Le lotier.—Biologie florale. Méthode de sélection possible. (Birdsfoot trefoil. Its floral biology. A possible method of selection).

Progr. agric. vitic. 1953 : 70 : 257-63.

In view of the possible value of *L. corniculatus* as a substitute for lucerne and its desirable agronomic characteristics, selection has been begun at the Agronomic Research Centre for the South-West, France. The initial programme has included the collection and observation of different types; vegetative multiplication; the study of the floral morphology and biology of the plant; selfing and crossing experiments; and a system of repeated mass selection applied to chosen clones morphologically and physiologically similar and interfertile, with a view to improving habit and leaf and stem characters.

ROOTS AND TUBERS

- 2121 POUND, G. S.

Diseases of beets.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 470-73.

Long Dark Blood is the variety least susceptible

to internal black spot. US 215 x 216 and its derivatives are resistant to *Cercospora beticola*.

- 2122 SCHAPER, P.

I. Resistenzzüchtung bei Hackfrüchten.
(b) Beta-Rüben. [Breeding for resistance in root crops. (b) Beta].

Saatgutwirtschaft 1954 : 6 : p. 39.

Breeding for resistance to yellows, mosaic, *Cercospora beticola* and *Heterodera schachtii* is discussed. Forms resistant to *C. beticola* have been obtained by selection from cultivated varieties. The wild species *B. patellaris* and *B. procumbens* may provide possible sources of limited resistance to yellows and *H. schachtii*.

- 2123 Voederbieten, 1954. (Mangels, 1954).

Landbouwvoorlichting 11 : Bijl. 10 :
Ber. Rassenkeuze No. 162 : 1954 : Pp. 6.

Tabulated data, based on trials held at several stations and on different types of soil, are presented. The information given includes particulars of root and foliage yields, dry matter content and yield, tendency to bolting, keeping quality and ease of harvesting of the main varieties grown in the Netherlands.

- 2124 SALZMANN, R.

Sortenversuche mit Futterrüben.

(Forage beet variety trials).

Mitt. schweiz. Landw. 1954 : 2 : 1-8.

A number of foreign varieties of forage beet were tested at different centres to determine which were most suitable for cultivation under Swiss conditions. Barres Ferritslev X gave the highest weight of roots, and Weisse Strynø X [White Strynø X] and Futterzucker Øtofte [Fodder-Sugar Øtofte] the highest yield of dry matter per ha. Gelbe Øtofte [Yellow Øtofte] produced most foliage and Gelbe Eckendorfer [Yellow Eckendorfer] was the easiest variety to harvest.

- 2125 MANNER, R.

Försök med foderrotfrukter vid Ullevi 1944-50. (Trials with forage root crops at Ullevi 1944-50).

Medd. Gullåsk. VäxtförädlAnst. 1952 :
No. 9-10 : 203-12.

Trials of beets and swedes on the Ullevi estate, Skänninge, are described. Figures are cited showing that (1) Hammenhög Barres outyielded Weibull's Barres Slättbo II and Svalöfs Barres halvång [Svalöf Barres Semi-long]; (2) the Hammenhög's Ljussröd [Hammenhög Light Red] and Gullåker sugar mangels outyielded Barres and the round Globus mangel; and (3) Hammenhög Bangholm swede gave the highest yield of dry matter per ha. and had also the

highest average dry matter content, as compared with four other varieties from Hammenhög, Gullåker and Svalöf.

2126 WALLACE, J. O.

Turnips and swedes for New Zealand conditions.

N.Z. J. Agric. 1953 : 87 : No. 4 : unpaginated.

The present approved list of swede and turnip varieties is given and compared with the varieties available in New Zealand before the war. The list was compiled after comparative trials had been made to ascertain which varieties were synonymous. The approved varieties are described.

2127 JOSEFSSON, A.

Svalöfs tetraploida Siriusrova. (The Svalöf tetraploid Sirius turnip).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 26-28.

The breeding of this variety (cf. Abst. 1204) at the Svalöf and other stations of the Swedish Seed Association is described, with notes on its characteristics and performance in trials in various localities from 1948 to 1951.

2128 OLSSON, G.

Crosses between *Brassica napus* L. and Japanese *Brassica napella* Chaix.

Hereditas, Lund 1954 : 40 : 249-52. (Abst.).

B. napella, introduced into Sweden from Japan, besides being morphologically similar to *B. napus* crossed easily with this species, producing fertile hybrids. It is therefore suggested that *B. napella* should be classified as a variety of *B. napus*. It is further suggested that *B. napus* sens. lat. may have originated independently in several regions from crosses between *B. campestris* and *B. oleracea*; varieties of *B. napus* may therefore have evolved in eastern Asia as well as in Europe.

2129 LAMB, K. P.

Field trials of five swede varieties with special reference to aphid resistance.

NZ J. Sci. Tech. 1953 : 35 : 135-45.

Calder and Sensation showed greater resistance to aphids, mosaic virus and soft rot and gave a higher yield than Grandmaster and Superlative. The variety Resistant supported lower numbers of aphids than Calder and had a significantly greater root weight. Resistance to *Myzus persicae* was associated with resistance to *Brevicoryne brassicae*.

2130 McDERMOTT, N.

Potato varieties—old and new.

J. R. hort. Soc. 1954 : 79 : 117-27.

Old and new varieties of potato grown in Britain are discussed, and it is shown that in spite of the introduction of numerous varieties during the past 25 years, the old varieties of 40 or 50 years ago are still used for a considerable acreage.

2131 Memoria de la Primera Reunión de Papa, realizada en la Est. Exp. de Balcarce 23 y 24 de Octubre de 1952. (**Report of the First Potato Meeting, held at the Balcarce Experimental Station 23 and 24 October 1952**).

Cent. Pampeano Invest. Agropec., Pergamino 1952 : Pp. 77. (Mimeographed).

The following contributions contain matter of interest to plant breeders.

Pasquale, D. R., Induni, C. J., Garay, O. A. & Calderoni, A. V. *Mejoramiento de la papa en Balcarce*. (Potato breeding at Balcarce). (pp. 31-39).

Of the three varieties most widely grown in Argentina, two, Katahdin and White Rose, suffer from the defect of short dormancy period. The Argentine variety Huinkul MAG, a very heavy yielder, is free from this defect but is susceptible to common scab and *Fusarium*. A number of seedlings from open pollination of Huinkul MAG have been examined and some of them combine the long dormancy period of the parent with greater resistance to scab and *Fusarium*; their yielding ability seems promising and is being further tested. Attempts to make crosses in the field all failed but crosses in the greenhouse in 1949-51 gave average sets of about 20%. From 2667 lines originally obtained, 236 seedlings have been retained for further examination; 64 different parental combinations were made, the most promising of which are enumerated.

Induni, C. J. *Observaciones sobre la colección de papas cultivada en la Estación Experimental de Balcarce*. (Observations on the collection of potatoes cultivated at the Balcarce Experimental Station). (pp. 41-42).

Hardly any of the varieties in the collection, over 400 in number, combined the good qualities of Huinkul MA and Katahdin; most of them germinated too quickly, others were too late in maturity or poor in quality. The only promising lines were clones 336-114 (No Blight x Katahdin) and B 321-31 (Houma x 96-56), both of which

have smooth white tubers with a long period of dormancy.

Calderoni, A. V., Fernández Valiela, M. V. & Bakarcic, M. *Fusariosis y marchitamiento de la papa. (Fusarium attack and wilt of potatoes).* (pp. 43-53).

The popular variety Huinkul MA has proved very susceptible in recent attacks of *F. solani* var. *eumartii*, the symptoms of which are described. The most resistant varieties were Katahdin and Pontiac.

Calderoni, A. V. & Induni, C. J. *Resistencia a sarna (Streptomyces scabies (Thaxter) Waksman and Henrici) en 127 variedades y clones de papa. [Resistance to scab (S. scabies (Thaxter) Waksman and Henrici) in 127 potato varieties and clones].* (pp. 67-70).

Resistance was displayed by the varieties Johansen, Jubel, Seneca and King George.

2132 ZUBELDIA, A.

La investigación sobre patata en Gran Bretaña. (**Potato research in Great Britain**).

Agricultura, Madr. 1953 : No. 254 : 332-35.

Reference is made to the work being carried out at the Scottish Society for Research in Plant Breeding on the production of blight-resistant and virus-resistant hybrids by crossing with species possessing hypersensitivity; at the Potato Genetics Station and Plant Breeding Institute, Cambridge, on species from South America; and at the Scottish Seed Testing Station on the evaluation of new varieties and on seed inspection.

2133 SKAARE, S.

Årsvekst og avling 1953 Vidarhov. (**Crops and yields, 1953, at Vidarhov**). Samvirke 1954 : 49 : 28-32.

In recording yields of varieties of cereals, potatoes, roots and other crops, the potatoes DS x Ås 737 and DS x Ås 1006, bred by Lunden, are mentioned favourably. The former has proved outstanding as a table potato.

2134 DE HAAN, H.

Potato breeding in the Netherlands. Euphytica, Wageningen 1953 : 2 : 113-21.

An historical account of potato breeding in the Netherlands is given and mention made of Dutch pioneers in this field. The principal aims in breeding to-day are improved quality and increased yield and resistance to disease, especially *Phytophthora*. The system of inspecting, testing and certifying seed potatoes and new varieties in the Netherlands is outlined.

2135 RIEMAN, G. H., COOPER, D. C. & HOUGAS, R. W.

Potato varieties derived from species hybrids.

Amer. Potato J. 1954 : 31 : 1-11.

Expeditions sent out by the USA, the USSR, Sweden, Germany and the British Commonwealth to discover new *Solanum* species are listed. The work on identification and classification of *Solanum* species, the quarantine arrangements for tubers entering the USA and the maintenance and evaluation of the American Potato Collection are mentioned. Breeding work which has been accomplished using wild and cultivated species is briefly reviewed and a list of varieties derived from species hybrids is given together with information on their yield, disease resistance and origin.

2136 SWAMINATHAN, M. S.

Studies on the inter-relationships between taxonomic series in the section *Tuberarium*, genus *Solanum*. I. *Commersoniana* and *Tuberosa*.

Amer. Potato J. 1953 : 30 : 271-81.

Ten crosses (3 intraseries and 7 interseries) were made between the diploid species *S. chacoense*, *S. parodii*, *S. saltense* and *S. schickii* of the series *Commersoniana* and *S. ajanhuiri*, *S. berthaultii*, *S. calcense*, *S. macolae*, *S. rybinii*, *S. simplicifolium*, *S. stenotomum* and *S. yabari* of the *Tuberosa* series (cf. PBA, Vol. XXII, Abst. 2810). Autotetraploids and allotetraploids of some diploid species and species hybrids were crossed with *S. tuberosum*. No seeds were produced by the hybrids on selfing or sib-crossing, but they could be back-crossed to *S. tuberosum*. Cytological studies indicated that the *Commersoniana* spp. and *Tuberosa* spp. have gene differences and small cryptic structural differences.

2137 MANNER, R.

Erfarenheter rörande spontant uppträdande förändringar av bestående natur i Early Puritan. (**Findings regarding spontaneous modifications of a constant nature in Early Puritan**).

Medd. Gullåsk. VäxtförädlAnst. 1952 : No. 9-10 : 240-47.

Different types of constant modifications in the potato are reviewed, including two mutants with light red skin found in white-skinned Hammenhög-0113 (Privera, a bolter type from Early Puritan); in one case all the tubers of the plant were affected in the other only some. The bolter type of variation is also described and its occurrence since 1940 in Early Puritan

at the Gullåker Plant Breeding Institute is recorded. About 250 such clones were studied in detail and compared with the normal type of Early Puritan to assess their possible practical value, yield, shape, size and weight of tubers, rate of development and of tuber formation, and the percentage of tubers fit for use being among the criteria used.

In general considerable variation was found between the different bolters; some were as early as Early Puritan, some exceeded it in yield, and others remained free from blight longer than the normal type. Hence a study of some of the best bolter types in different varieties of potatoes might be of practical value.

- 2138 SAVINSKAJA, N. V.
(**Heterogeneity of tissues in the potato tuber**).
Izv. Akad. Nauk SSSR (News Acad. Sci. USSR) 1953 : No. 6 : Ser. Biol. : 4-21. [Russian].

Strains with improved yield and vigour and increased starch and dry matter contents were obtained by removing the initial buds and thus inducing secondary buds from the inner tissue to develop. Several clones of Zarnica [Dawn] yielding more tubers and starch per plant than the initial form have been selected.

- 2139 IVANČENKO, G. Z.
(**Selection of seedling potatoes**).
Zemledelie (Agriculture) 1954 : No. 1 : 86-88. [Russian].

Experiments at Moscow suggest that selection of seedlings in the first seed generation is premature and that the yield of an F_1 plant is unrelated to lateness or susceptibility to physiological deterioration of its tuber progenies. Some early and late forms have been selected from high yielding F_1 plants. The late types, still under trial, include hybrids 1436s/44, 420s/46 and 5899s/44, which are noted for their high yields and resistance to physiological deterioration. It is urged that selection for economic characters should begin with the first tuber generation.

- 2140 SCHUSTER, G.
Deutsche Agrarwissenschaftler berichten aus der Sowjetunion (VIII). Das Abbauproblem der Kartoffel in der Sowjetunion. [**German agronomists report from the Soviet Union (VIII). The problem of degeneration in the potato in the Soviet Union**].

Dtsch. Landw., Berl. 1953 : 4 : 569-73.

The writer discussed degeneration in the potato

with a number of Soviet scientists. Lysenko stated that degeneration, especially in the south of the USSR, was due mainly to high temperatures and unfavourable soil conditions, virus diseases being of secondary importance. Rozalin planted rows of healthy and degenerated potatoes side by side, and attributed the subsequent deterioration of the healthy plants to excessively high soil temperatures caused by the insufficient shade afforded by the degenerate plants. Attention is being paid to breeding varieties resistant to degeneration by rearing them in a favourable environment.

- 2141 PROKOFJEVA-BELJGOVSKAJA, A. A.
(**Amitosis in the starch-forming cells of potato tubers**).
Izv. Akad. Nauk. SSSR (News Acad. Sci. USSR) 1953 : No. 6 : Ser. Biol. : 22-36. [Russian].

Some nuclei of the starch-producing cells of growing potato tubers divided by a method other than normal mitosis during the period of intensive synthesis of starch in the tuber. Changes occurring in the cell nuclei before division are described.

- 2142 SWAMINATHAN, M. S.
(**Nature of polyploidy in some 48-chromosome species of the genus *Solanum*, section *Tuberarium***).
Genetics 1954 : 39 : 59-76.

The species studied comprised *S. acaule*, *S. longipedicellatum*, *S. andigenum* and *S. tuberosum*. In both *S. tuberosum* and *S. longipedicellatum* the somatic chromosomes could be divided into seven different groups. Each of these two species had two chromosomes bearing satellites in their short arms and two chromosomes with secondary constrictions in their long arms. No conspicuous differences between the idiograms of the two species could be detected. At metaphase I of meiosis, *S. acaule* and *S. longipedicellatum* usually formed 24 bivalents. At metaphase I in *S. andigenum* and *S. tuberosum*, the mean pairing frequencies were $2.70_I + 19.74_{II} + 0.11_{III} + 1.37_{IV}$ and $2.23_I + 18.61_{II} + 0.166_{III} + 2.0_{IV}$, respectively.

Chromosome doubling was induced in *S. tuberosum*, *S. acaule* and *S. longipedicellatum* by colchicine-agar treatment of the seed (cf. *PBA* Vol. XXI, Absts. 1942 and 1946). Octoploids of the last two species were vigorous and fertile; those of *S. tuberosum* were dwarf and failed to flower. Associations higher than quadrivalents were not observed at metaphase I in octoploids of *S. acaule* and *S. longipedicellatum*. Colchicine-induced decaploids ($2n =$

120) of *S. demissum* x *S. tuberosum* were more vigorous than octoploid *S. tuberosum* but were low in fertility. In F_1 hybrids ($2n = 72$) of *S. longipedicellatum* octoploid ♀ x *S. tuberosum* ♂ and *S. acaule* octoploid ♀ x *S. tuberosum* ♂, bivalent pairing was nearly regular. In the pentaploid hybrid ($2n = 60$) of (*S. acaule* octoploid x *S. tuberosum*) x *S. tuberosum* 3-6 trivalents were formed, suggesting the occurrence of associations between some members of the 3 sets of *S. tuberosum* chromosomes present in the hybrid. One plate in the pentaploid showed $2_v + 6_{III}$. Colchicine-induced amphidiploids ($2n = 72$) of *S. acaule* x *S. simplicifolium* were fertile, in contrast to the sterile F_1 triploid hybrid, and exhibited regular bivalent pairing. The two plants obtained from the back cross (amphidiploid *S. acaule* x *S. simplicifolium*) x *S. simplicifolium* had $2n = 48$ and 47 respectively. The 48-chromosome individual had compound leaves resembling those of *S. acaule*, but the 47-chromosome one had simple leaves like *S. simplicifolium*; *S. acaule* therefore appears to be disomic for *L*, the factor for compound leaf. It is suggested that (1) *S. acaule* and *S. longipedicellatum* are segmental allotetraploids, (2) *S. andigenum* and *S. tuberosum* originated as autotetraploids although present-day varieties may be considered to be segmental allotetraploids, and (3) on both taxonomic and cytogenetical grounds *S. andigenum* may be regarded as a subspecies of *S. tuberosum*.

2143 SINHA, N. P.

Meiosis in an artificial octoploid *Solanum* species.

Proc. Bihar Acad. agric. Sci. 1953-54 : 2-3 : 136-38.

Some octoploid plants of *S. acaule* ($2n = 48$) studied at Sabour were obtained from Boghall, Scotland. The formation of quadrivalents and trivalents during meiosis is recorded. Chromosomes excluded from the daughter nuclei, apparently by the rapid formation of the nuclear membrane, may form separate spindles and micronuclei.

2144 KAWAKAMI, K.

Physiological aspects of potato seed tubers.

Hyogo Agric. Coll., Sasayama 1952 : Pp. 114.

In the course of physiological studies the dormancy period was found to vary from 8 or 9 weeks for Early Rose and IS 29, to 17 weeks for IS 14. Varieties were compared for the yield which they gave when grown from autumn-grown stored tubers and spring-grown ethylene

chlorhydrin treated tubers. According to the length of the rest period and their response to ethylene, 38 varieties were classified into 5 types.

2145 TAYLOR, C. E.

The vegetative development of the potato plant.

Ann. appl. Biol. 1953 : 40 : 778-88.

The number of leaves formed on the main axis, the development of axillary shoots and the total leaf area were compared with the number of stolons produced at different stages in the development of four varieties. The early varieties Ulster Chieftain and Arran Pilot produced a smaller haulm in relation to the number of stolons than the main-crop varieties King Edward and Stormont Dawn, indicating a basic difference in the early distribution of growth substances.

2146 SIMON, W.

Verbesserte Pflanzgutvorbereitung durch Wässern der Kartoffeln. (Untersuchungen über Keimhemmungs- und Keimförderungsmaßnahmen). [Better preparation of seed potatoes by washing. (Investigations into methods of inhibiting and promoting growth)].

Z. Acker- u. PflBau 1954 : 97 : 369-88.

Early varieties and Aquila showed a loss in yield after treatment with chemical growth inhibitors but Capella and Merkur gave increased yields; the yields of most late varieties were unaffected. Washing the tubers in warm water stimulated the natural growth substances and resulted in a shortening of the period of dormancy and in increased yields, Ackersegen and Johanna reacting best to this treatment.

2147 ESTRADA RAMOS, N.

Factores ecológicos en la adaptación de especies y variedades de papas: I. Luz y temperatura. (Ecological factors in the adaptation of potato species and varieties. I. Light and temperature).

Agricultura trop. 1953 : 9 : No. 7 : 25-32 & No. 8 : 39-48.

A descriptive account is given of the subspecies *andigenum* and *chileanum* of *Solanum tuberosum*, a number of wild species characterized by short-day reaction are enumerated, and the literature on photoperiodism in potato species is reviewed. In Colombia, the differences between normal potatoes and bolters are more evident when the two are grown at altitudes above 2600 m. than at altitudes of 2000 m. but

in all cases the bolters flower and the "normal" plants do not. Domestic potato varieties introduced from Europe show a gradual adaptation when grown for several tuber generations in Colombia, and some of them have displayed a quite clear reversion to the *andigenum* type, involving almost all characters and representing a change more extreme than that of the normal to the bolter. The reverted forms yield about twice as many tubers per plant as the forms from which they are derived.

2148 THIJN, G. A.

Observations on flower induction with potatoes.

Euphytica, Wageningen 1954 : 3 : 28-34.

In experiments at the Potato Breeding Station, Emmeloord, Netherlands, grafting on tomato or planting the sprouting tubers on bricks were found to be useful methods of inducing flowering. Double grafting and a combination of incision and ligature of the stems were valuable auxiliary procedures. The best method for inducing flowering in a given variety has to be determined by experience.

2149 ZADINA, J.

(Use in breeding of potato varieties that fail to flower or to set fruits).

Za socialist. sel'skhozjaistv. Nauk. (For socialist agric. Sci.), Praha 1953 : Ser. A : No. 5 : 419-28. [Russian].

Czechoslovakian experiments on methods of overcoming various causes of sterility in the potato are discussed. The variety Bintje was induced to flower by growing the plants in Dutch lights or by grafting them on to tomato stocks. Berry formation in Bintje and Triumph was stimulated by some chemical agents and in the last-named variety by a mixture of potato, rye and poppy pollen. Interspecific incompatibility between *Solanum demissum*, which shows resistance to *Phytophthora*, and some domestic varieties was overcome by vegetative rapprochement. The wild species was grafted on an Eersteling or Triumph stock and then pollinated with mixed pollen of several domestic varieties. Some vigorous plants have been raised from seed from this cross.

2150 ESTRADA RAMOS, N.

Una variedad de papa con buenas características para cultivar en los páramos colombianos. **(A potato variety with good characteristics for growing in the Colombian paramos).**

Agricultura trop. 1953 : 9 : No. 12 : 21-26.

The potato in question is a clone of the variety Londres of *Solanum tuberosum* subsp. *andigenum*,

distinguished by higher yielding ability than the parent or than any of the local varieties. It has a longer period of dormancy than these and matures somewhat later.

2151 Verslag van de stamselectiedag, gehouden op 27 Februari 1951 in het gebouw voor Kunsten en Wetenschappen te Utrecht. **(Account of the clonal selection meeting held on 27 February 1951 in the building for Arts and Sciences, Utrecht)** : Pp. 42.

An account of the programme of interclonal selection initiated in 1948 to improve yield, virus resistance, quality and size of tuber is given, together with a description of the procedure for the inspection and grading of seed potatoes. Details of the comparative yield and distribution of tuber size for selected lines of Bintje, Eigenheimer, Voran and Alpha are presented and varietal differences in producing bolters and other mutations noted. Bintje and Eigenheimer were most prone to mutation. Alpha did not display as many deviations in type as the other varieties.

2152 NISSEN, M.

Kartofflers vægt i vand. (The weight of potatoes in water).

Tidsskr. Planteavl 1954 : 57 : 121-64.

The technique of determining the weight of potatoes in water (cf. *PBA*, Vol. XVI, Abst. 1795) is critically discussed in the light of investigations at the Tylstrup Research Station, Denmark, into the relation between (a) dry matter and starch content of potatoes and (b) the weight in water, estimated with and without elimination of the air from the tubers.

2153 GROSKREUTZ, K. A.

Verhalten der Kartoffelsorten in der Miete. (Behaviour of potato varieties in the clamp).

Mitt. dtsh. LandwGes. 1954 : 69 : 98-101.

The tendency of seven varieties to sprout and to generate heat whilst in the clamp is compared. No correlation between the two factors was established. The variety whose rate of respiration was most sensitive to the external environment was Ackersegen.

2154 Kartoffelsorten zur Auswahl. **(A choice of potato varieties).**

Mitt. dtsh. LandwGes. 1954 : 69 : 124-27.

Morphological characteristics, susceptibility to disease, maturity, yield and starch content are tabulated for 75 varieties cultivated in Germany.

- 2155 Aardappels, 1954 (Interprovinciale proefvelden). [**Potatoes, 1954 (Interprovincial experimental fields)**]. Landbouwwoorlichting 11 : Bijl. 14; Ber. Rassenkeuze No. 166 : 1954 : Pp. 6.

Data on maturity, yield and quality of tubers, starch and dry matter percentage and yield per ha. are presented for the main varieties cultivated in the Netherlands for human consumption, export, and forage and industrial purposes.

- 2156 Variétés inscrites au catalogue des espèces et variétés en 1953. (**Varieties entered in the catalogue of species and varieties in 1953**).

Pomme d. Terre franç. 1954 : 17 : No. 173 : p. 21.

Three varieties of potato, Panther, Urtica and Frühperle [Early Pearl], are listed, with the breeder's name and notes on their genetic origin, type of tuber, habit, stems, foliage, flowers, diseases, earliness, yield and starch content, except in the case of Frühperle, for which neither yield nor starch content are given.

- 2157 SCHULTZ, E. S.

Control of diseases of potatoes.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 435-43.

Varietal resistance to *Phytophthora infestans*, *Streptomyces scabies*, *Verticillium albo-atrum*, *Erwinia atroseptica*, *Corynebacterium sepedonicum* and viruses X, Y and A is discussed.

- 2158 SCHAPER, P.

Resistenzzüchtung bei Hackfrüchten. (a) Kartoffel (*Solanum tuberosum* L.). [**Breeding for resistance in root crops. (a) Potato (*S. tuberosum* L.)**]. Saatgutwirtschaft 1954 : 6 : 11-12.

A popular account of breeding for disease resistance in the potato is given, with special reference to crosses between cultivated varieties and wild *Solanum* species. Progress has also been made in breeding varieties resistant to the Colorado beetle. Hybrids involving *S. chacoense* have been raised which are not attacked by the beetle and give a yield 60% of that of standard varieties.

- 2159 TOXOPEUS, H. J.

Over het gebruik van "wild" materiaal bij de aardappelveredeling. I. (**On the use of wild material in potato breeding. I.**).

Meded. Ned. Alg. Keuringsdienst Landbouwzaden Aardappelpootgoed 1954 : 10 : 68-70.

A comprehensive account of crosses made between wild and cultivated varieties is given.

Among breeding achievements during the past two decades has been the transfer to cultivated varieties of genes for resistance to *Phytophthora infestans*, viruses X and Y, the Colorado beetle and frost. A new variety, Prof. Broekema, from the cross Record x (Ultimus x *Solanum andigenum* R 514), derives its high starch content from its *S. andigenum* ancestor. Many unexploited sources of wild material remain.

- 2160 JÄHNEL, G.

Ergebnisse der Kartoffelversuche des Jahres 1953. (**Results of potato tests during 1953**).

VersErgebn. Bundesanst. alp. Landw., Admont 1954 : No. 24 : 1-50.

Among the early varieties Allerfrüheste Gelbe [Yellow Earliest of All], Oberarnbacher Frühe [Oberarnbach Early], Frühgold [Early Gold], Corona, Erstling and Bintje gave the highest yields. Of late varieties Jakobi, Ackersegen, Maritta, Merkur and Falke [Falcon] were most productive. Erstling, Oberarnbacher Frühe, Corona and Maritta proved highly resistant to virus attack. Böhms Mittelfrühe was resistant to virus attack and to *Phytophthora*. Data on varietal differences in starch content, shape and size of tuber and susceptibility to tuber diseases and black leg are also presented.

- 2161 VOTUPAL, B.

Rzivot bramborových hlíz. (**Internal rust spot in potato tubers**).

Sborn. čsl. Acad. Zeměd. 1954 : 27 : 15-30.

Experiments at Keřkov and other centres in Czechoslovakia showed susceptibility to internal rust spot to be a genetically determined character. Reference is made to varietal differences in susceptibility.

- 2162 NIELSEN, L. W.

The susceptibility of seven potato varieties to bruising and bacterial soft rot.

Phytopathology 1954 : 44 : 30-35.

Bliss Triumph, Irish Cobbler, White Cloud, Sebago, Essex, Chenango and Kennebec were the varieties tested. The late varieties Kennebec, Chenango and Essex were most resistant to bruising, and Essex, Bliss Triumph, and Kennebec were most resistant to bacterial soft rot.

- 2163 SCHAAL, L. A., JOHNSON, G. & SIMONDS, A. O.

Comparison of scab resistance of potato tubers as indicated by the ferric chloride test.

Amer. Potato J. 1953 : 30 : 257-62.

The greater the resistance of potato tubers to

Streptomyces scabies the greater the concentration of chlorogenic acid found beneath the skin and round the lenticels. The depth of the colour change obtained by macerating the surface tissue in ferric chloride indicates the amount of chlorogenic acid present. The tubers can still be used as seed after the test.

2164 HOFFMANN, G. M.

Die Schorfresistenzprüfung im Freiland, ihre Möglichkeiten und ihre Anwendung. (The testing of scab resistance in the open, its possibilities and application).

Züchter 1954 : 24 : 11-17.

A method is described by which potato varieties may be tested in the field for resistance to *Streptomyces scabies*. Of nine varieties tested, Ackersegen proved the most resistant to infection.

2165 The comparative resistance of some potato varieties to common scab.

J. Aust. Inst. agric. Sci. 1953 : 262-64.

Cayuga, Ontario, 1937-12, 1413-119, 1523-11, Late Carman, Sebago and King Edward were rated for resistance to *Streptomyces scabies* on the basis of severity and extent of scab infection. No varieties were sufficiently resistant to warrant using them as the basis of a breeding programme. The resistant types gave lower yields than Sebago and Late Carman.

2166 SEGURA, C. BAZÁN DE

Razas fisiológicas de *Phytophthora infestans* en el Perú. Investigaciones sobre resistencia de especies, variedades e híbridos de papa al *P. infestans* en el C.N.I.E.A. "La Molina" 1951. (Physiological races of *Phytophthora infestans* in Peru. Investigations on the resistance of potato species, varieties and hybrids to *P. infestans* at the La Molina National Centre of Agricultural Investigation and Experimentation 1951).

Bol. Cent. Invest. agríc., Lima 1952 : No. 46 : 3-14. (Mimeographed).

The resistance of Black's differential varieties Craigs Snow White, 1318 (3), 1253a (12) and 1786a and two species, *S. tuberosum* and *S. demissum* (Malchoa 49), from the La Molina station, to *Ph. infestans* cultures LM 49, LM 51, H 50 and M 51 isolated in Peru, was tested. It was found that H 50 corresponded to race A, LM 51 and M 51 to race C, and LM 49 to race

D. Significant differences in the width and length of the spores of the different races after inoculation into the leaves and tubers of *S. andigenum* were discovered. The virulence of the races on *S. andigenum* was related positively to the amount of mycelium produced and the size of the spores, race A being least virulent and race D most virulent. A series of *Solanum* species, varieties and hybrids were inoculated with races C and D of *Ph. infestans*. The results are tabulated and those immune are listed. Lines 020 and 038 of *S. demissum* and 032 of *S. antipoviczii* are immune to races C and D. Lines from the cross *S. antipoviczii* x 07-4-47 were immune to race C, having previously shown immunity to races A and D.

2167 MASTENBROEK, C.

Experiments on the inheritance of blight immunity in potatoes derived from *Solanum demissum* Lindl.

Euphytica, Wageningen 1953 : 2 : 197-206.

At Hoofddorf it was shown that a fourth gene R_4 (cf. PBA, Vol. XXIII, Abst. 2049) accounted for the immunity of clone 4431-15. Progenies of crosses involving gene combinations $R_1 \times R_3$, $R_1R_3 \times r$, $R_1R_3 \times R_3$, $R_1R_3 \times R_1$, $R_3 \times R_1R_2$, $R_3 \times R_1R_3$, $r \times R_1R_3$, $R_1R_3 \times R_1R_2$, and $R_1R_3 \times R_1R_3$ and of R_1R_3 (spontaneously pollinated) were inoculated with races 1,2,4 and 2,3,4 of *Phytophthora infestans*. One $R_3 \times R_1R_3$, two $R_1R_3 \times R_1R_3$ and six out of the ten spontaneously pollinated progenies gave fewer immune seedlings than the theoretical expectation.

2168 BLACK, W., MASTENBROEK, C., MILLS, W. R. & PETERSON, L. C.

A proposal for an international nomenclature of races of *Phytophthora infestans* and of genes controlling immunity in *Solanum demissum* derivatives.

Euphytica, Wageningen 1953 : 2 : 173-79.

Parallel studies of blight races and differential hosts in Scotland, the Netherlands and the USA have been made to establish the correspondences between the races recognized by Black, Mastenbroek, and Mills and Peterson (cf. PBA, Vol. XXII, Absts. 2038 and 2039). The following relations were established, the proposed international designation of the race being given first (cf. Vol. XXIII, Abst. 2048), followed by the designations used in recent papers by Black,

Mastenbroek, and Mills and Peterson, respectively: race O = A = NI = A; 1 = B¹ = NZ = D; 2 = H = N5 = C; 3 = J (of Black); 4 = D = N4 = B; 1,2 = G (of Black); 1,3 = E (of Black); 1,4 = B² = N7 = BD; 2,4 = C = N6 = BC; 3,4 = I (of Black); 1,2,4 = N8 (of Mastenbroek); 1,3,4 = F (of Black); and 2,3,4 = N9 (of Mastenbroek).

2169 PRISTOU, R. & GALLEGLY, M. E.
Leaf penetration by *Phytophthora infestans*.

Phytopathology 1954 : 44 : 81-86.

Histological studies of leaf penetration of the susceptible potato Cobbler and resistant variety Kennebec by potato race A of *Ph. infestans* showed that, prior to penetration, the zoospores encysted, germinated and produced appressoria. A minute infection peg developed by the appressorium entered the epidermal cell and established a primary mycelium. On both resistant and susceptible hosts, penetration was accomplished 2 hours after inoculation. Typical lesions of the spreading type were developed on Cobbler, whereas Kennebec produced pin-point necrotic spots. Points of penetration were more numerous on Cobbler than on Kennebec leaves. In sections of the latter, the mycelium was never observed beyond the cell originally penetrated; death of the cells surrounding the point of penetration occurred 48-72 hours after inoculation. Mechanical pressure is apparently responsible for the initial penetration. Some substance, however, acts in advance of the invading hyphae; cell walls below the point of penetration or a clump of germinating zoospores showed an increased affinity for the safranin strain.

2170 MÜLLER, K. O.
The nature of resistance of the potato plant to blight—*Phytophthora infestans*.

J. nat. Inst. agric. Bot. 1953 : 6 : 346-60.

Two kinds of resistance are differentiated. True resistance is due to hypersensitivity of the plant to the disease, and is only found in crosses with wild species. The genes involved here do not control resistance itself, but only the reaction potentials brought about when the host cell is invaded by a parabiogenic strain. Field resistance is due to varietal differences in the speed with which the blight spreads. Formulae and graphs illustrating this point are given, and experiments illustrating varietal differences in susceptibility described.

2171 SEGURA, C. BAZÁN DE
Trabajos preliminares para la obtención de variedades de papa resistentes al "hielo" (*Phytophthora infestans*) en el C.N.I.E.A. de La Molina. [Preliminary work for obtaining potato varieties resistant to blight (*Ph. infestans*) at the National Centre of Agricultural Investigation and Experimentation at La Molina].

Bol. Cent. Invest. agric., Lima 1951 : No. 43 : 1-15. (Mimeographed).

In order to improve the potato varieties grown in Peru, crosses were made in 1948 between *S. andigenum* plants selected for good vegetative development and the hybrids EPC 1508 x EPC 1468 and EPC 1468 x EPC 1492a obtained from England, and in 1949 among *S. anti-poviczii*, the English hybrids, wild Argentine species and cultivated Peruvian varieties. When the F₁ generations of these crosses were tested for resistance to *Ph. infestans*, those of *S. anti-poviczii* with the English hybrids and with the Peruvian cultivated varieties were immune.

2172 SEGURA, C. BAZÁN DE
Reacción de las variedades de papa peruanas al "hielo" (*Phytophthora infestans* (Mont.) de Bary). [Reaction of Peruvian potato varieties to blight (*Ph. infestans* (Mont.) de Bary)].
Bol. Cent. Invest. agric., Lima 1951 : 43 : 16-22. (Mimeographed).

The reactions of about 250 potato varieties to *Phytophthora infestans* are tabulated. No varieties showed resistance under Peruvian conditions.

2173 DE ROJAS PEÑA, E.
El problema de las razas fisiológicas de *Phytophthora infestans* (Mont.) de Bary, en el fitomejoramiento de la papa. Contribución a su estudio. [The problem of physiological races of *Ph. infestans* (Mont.) de Bary in potato breeding. Contribution to the study of them].
Informac. téc. Min. Agric. Bogotá 1953 : 1 : No. 1 : 1-78.

Collections of blight from different places in Colombia all conformed to the common race A from the United Kingdom, with one exception, which corresponded to Black's D strain (cf. PBA, Vol. XXIII, Abst. 2048). All varieties of *Solanum tuberosum*, *S. andigenum* and *S. rybinii* cultivated in Colombia proved susceptible to race A. Many hybrids of *S. demissum* x *S. andigenum* produced at the Usme Experimental

Station in Colombia are resistant to race A but most of them are attacked by D, only one seedling having displayed a certain degree of resistance. Certain forms of *S. demissum* were immune, as were also *S. malinchense* and *S. andreaeanum*.

Blight material collected in Mexico was also analysed and proved to be different from any of the races described in Pennsylvania by Mills and Peterson (cf. *PBA*, Vol. XXII, Abst. 2038); it closely resembled Black's race F and only one of the *S. demissum* hybrids tested proved immune to it, namely GDS, referred to as a back cross *S. demissum* 245/25: Runa obtained from Reddick. However, a number of wild Mexican species are immune to it and are enumerated.

2174 MÜNSTER, J.

Trois nouvelles variétés de pommes de terre pour l'assortiment officiel suisse. (**Three new potato varieties for the Swiss official assortment**).

Rev. rom. Agric. 1951 : 7 : No. 9 : 65-67.

Foreign varieties recommended in 1951 for cultivation in Switzerland are described. Bona is a high-yielding, yellow-fleshed mid-early variety of good keeping quality, but is susceptible to late blight and virus attack. Jakobi, a yellow fleshed mid-early variety, yields well and is resistant to late blight, but is susceptible to drought. Urgenta yields well and has good cooking properties.

2175 KULMATYCKA, I., LESZCZENKO, P. & ZACHAROWA, M.

Rak ziemniaczany i rakoodporne odmiany ziemniaków. (**Potato wart disease and wart-resistant varieties of potatoes**).

Roczn. Nauk rol. 1953 : 67 : Ser. A : 57-68.

Synchytrium endobioticum, its development in the potato and its biotypes are described. A brief summary, relevant to breeding, is also given of the genetics of resistance in the light of research by other investigators of resistance. The method used by the authors for studying wart disease in the field and laboratory is described. During 1946-52, at the Institute of Plant Breeding and Acclimatization at Bydgoszcz, some thousands of lines of seed potatoes and potato races were tested for resistance. Some of the new Polish varieties were completely resistant, others showed only field resistance, succumbing to infection under laboratory conditions, the infection, however, being of a milder type than that of susceptible varieties. Lists are given of Polish and foreign varieties raised and cultivated in Poland; of these, 90 were resistant and 17 susceptible to wart.

2176 TESCHNER, G.

Untersuchungen über *Alternaria solani*, den Hartfäule-Erreger der Kartoffel und Fruchtfäule-Erreger der Tomate. (**Investigations on *A. solani*, the hard rot pathogen of the potato and the fruit rot pathogen of the tomato**).

Phytopath. Z. 1953 : 21 : 133-62.

From a study of isolates of *A. solani* from potato leaves and tubers and from tomato leaves and fruits evidence is advanced to show that numerous different strains of the fungus occur and that biotypic differences also exist within these strains.

2177 ROBINSON, D. B. & AYERS, G. W.

Fusarium storage rot of potatoes in Prince Edward Island.

Canad. J. agric. Sci. 1953 : 33 : 566-71.

The pathogenicity of three biotypes of *F. sambucinum* f.6 was tested on the varieties Irish Cobbler and Sebago. The biotypes showed significant differences in pathogenicity though Irish Cobbler was more resistant to all three biotypes than Sebago.

2178 ELLENBY, C.

The eelworm and the potato.

Discovery 1954 : 15 : 35-36.

Six forms of potato apparently resistant to eelworm were found among the Commonwealth Potato Collection. When these forms and cuttings from them were tested in Holland they were either heavily infected with eelworm or markedly free. All the cuttings from the same plant gave the same result (cf. Abst. 424).

2179 SCHMIDT, J.

Untersuchungen über den Kartoffelnematoden. (**Investigations on the potato nematode**).

PflSchutztag. Berlin 12-14 März 1952 : 49-53.

Various methods of combating the nematode are discussed. Experiments conducted at Rostock in 1950 showed Capella, Voran and Merkur to be comparatively tolerant of the pest. Early varieties proved more susceptible than late.

2180 HUYSMAN [HUIJSMAN], C. A.

De vererving van de resistentie tegen het aardappelcystenaaltje voorkomende in *S. andigenum* C.P.C. 1673. (**The inheritance of resistance to the potato cyst eelworm occurring in *S. andigenum* CPC 1673**).

Versl. StudKring. PlantVeredel., Wageningen 1954 : 528-32. (Mimeographed).

An account of the symptoms shown by eelworm-infested plants is given and the results of tests

conducted since 1951 with the Commonwealth Potato Collection strains 1673, 1685 and 1692 are reported, together with tabulated data on crosses between these strains and crosses with susceptible commercial varieties. Resistance to the eelworm is genetically determined and appears to be attributable to a single dominant gene *H* (cf. Abst. XXIII, 2800).

2181 TOXOPEUS, H. J. & HUIJSMAN, C. A.

Breeding for resistance to potato root eelworm. I. Preliminary data concerning the inheritance and the nature of resistance.

Euphytica, Wageningen 1953 : 2 : 180-86.

At Wageningen, resistance in clones CPC 1673, 1685 and 1692 of *Solanum tuberosum* subsp. *andigenum* was shown to be due to a dominant gene *H*. There was an excess of recessives in crosses with commercial varieties although a high percentage of resistant hybrids was obtained. Female larvae which penetrated resistant plants did not reach maturity.

In seedling 15 from clone CPC 1685, resistance depended on two dominant genes, designated *K* and *L*.

2182 **The potato root eelworm and its control.**

Nature, Lond. 1954 : 173 : 295-96.

An account of the symposium on the above topic, held in London by the Association of Applied Biologists, 8 January, 1954, is presented. Among the contributions was a survey by F. G. W. Jones, discussing the possibilities of controlling the pest by breeding resistant varieties. German workers are exploring the value of *Solanum ballsii* (= *vernei*) as a source of resistance; Dutch and British workers are using *S. andigenum* as the resistant parent. Resistance apparently depends upon a dominant gene, whose tetrasomic inheritance results in varying degrees of resistance and susceptibility. The practical degrees of resistance so far obtained are rather low. It is suggested that the problem could be approached by making use of a low cyst-hatching stimulus, such as that shown by crosses between *S. stenotomum* and *S. ballsii*, or by combining a high cyst-hatching stimulus with innate resistance to provide a trap crop and thus to reduce the effective eelworm population.

2183 KATO, M.

(Aphid associations on various potato varieties).

Seitaigaku Kenyu/Ecol. Rev. 1953 : 13 : 137-41. [Japanese].

A study was made of the seasonal degree of infestation of ten Japanese varieties by (1)

Aulacorthum matsumuraeanum, (2) *Myzus persicae* and (3) *Aphis gossypii*. With respect to aphid (1), the varieties could be classified into 4 groups in respect of seasonal behaviour of the insects. In the case of aphid (2), the varieties could also be grouped into 4 categories corresponding to the 4 types of seasonal behaviour noted for aphid (1). The varietal components of the corresponding pairs of groups for aphids 1 and 2 were frequently but not invariably the same. The behaviour of aphid (3) was quite different from that of aphids (1) and (2); 5 types of seasonal behaviour were recognized and the varietal components bore no evident relation to those of the first two sets of groups.

2184 WINNING, E. VON

Stand der Hybridenforschung und ihre Aussichten. (The state of hybrid research and its prospects).

PflSchutztag. Berlin 12-14 März 1952 : 136-43.

A review of current research on the breeding of new potato varieties resistant to the Colorado beetle is presented, together with a summary of the literature on the subject. Breeding objectives should be to produce clones resistant to both the larva and the mature beetle. A list is given of wild *Solanum* species resistant or semi-resistant to the pest, and special mention made of crosses of *S. tuberosum* with *S. demissum* and *S. chacoense*.

2185 M'INTOSH, T. P.

Foundation seed maintaining health in high-grade potato stocks.

Scott. Agric. 1953-54 : 33 : 148-52.

The Department of Agriculture for Scotland reports that the varieties King Edward, Epicure, Ninety-fold, Craigs Defiance, Craigs Royal and Pentland Ace are field-immune from virus X. Gladstone is comparatively resistant.

2186 HOFFERBERT, W.

Kartoffelzucht in Niedersachsen.

(Potato breeding in Lower Saxony).

Kartoffelbau 1954 : 5 : 23-24.

A historical survey of potato breeding in Lower Saxony is given, with special reference to breeding for virus resistance.

2187 NORRIS, D. O.

The effect of virus X on yield of potatoes—an assessment.

J. Aust. Inst. agric. Sci. 1953 : 19 : 251-56.

In most cases virus-free stock gives higher yields than infected stock but some infected locally-adapted varieties may give higher yields than uninfected varieties of different origin.

2188 CULLEN, J. C.

Maincrop potato variety trials 1942-1952.

J. nat. Inst. agric. Bot. 1953 : 6 : 361-95.

The results of yield trials of maincrop varieties in England during the period 1942-52 are considered in detail. In the 1942-44 trials, conducted at Cambridge, Cannington, Kirton and Sutton Bonington, Arran Banner was the only variety to outyield the control Majestic, and showed a general superiority over other varieties tested, irrespective of centre, soil fertility or season. Late-maturing varieties showed no superiority in yield. In 1946-49, trials of white-skinned, oval or kidney-shaped varieties of recent introduction were held in 32 centres throughout England. Arran Viking gave the highest and most consistent yields of the five varieties tested. In the 1950-52 trials of white-skinned oval or kidney-shaped varieties, held in different years in 15 to 20 centres, Ulster Supreme gave the highest yield in almost all cases.

2189 HÖPPNER, E. & GEIDEL, H.

Kartoffel-Sortenversuche 1953. (Potato variety trials 1953).

Kartoffelbau 1954 : 5 : 58-59.

A summary of the results of variety trials throughout Western Germany from 1951 to 1953, with special reference to 1953, is presented. Forelle [Trout] gave the highest average yields among the early varieties. Augusta, Bona and Cornelia were superior among the medium early varieties and Magna and Lerche [Lark] gave the highest yields of the late varieties tested.

2190 Résultats d'essais réalisés dans la Métropole. Année 1953. (Results of trials conducted in Metropolitan France in 1953).

Pomme d. Terre franç. 1954 : 17 : No. 175 : 20-24.

Of the early varieties of potato, Viola and Saskia gave the highest yields. Industrie [Industry] and Voran were superior among the late varieties. Voran, Ackersegen, Ostbote [Eastern Messenger], Urgenta, Muntinga 17, Ker Pondy and Belle de Locronan [Locronan Beauty] displayed a high degree of resistance to late blight.

2191 Aardappels, 1954 (Observatieproefvelden). [Potatoes, 1954 (Observation experimental fields)].

Landbouvoorlichting 11 : Bijl. 15; Ber. Rassenkeuze No. 167 : 1954 : unpaginated.

The results of preliminary trials in the Netherlands of several new varieties are given, together with data on yield, quality, maturity, dry

matter content and degree of resistance to *Phytophthora*.

2192 Pontiac, Katahdin, Ontario, lead... 1952 potato variety trials.

Research, Kingston, RI 1953 : 3 : 44-45.

From trials of 24 varieties, data on yield, starch percentage and maturity time are tabulated. Pontiac, Katahdin and Ontario gave the best yields. No tuber rot occurred on Pontiac, Katahdin, Ontario, Menominee, Sebago, Sequoia and Mohawk. Blackleg was not severe on Pontiac, Green Mountain, Teton, Erie and Earlane.

2193 HOGEN ESCH, J. A.

Fifteen years activity of the Commission for the Advancement of Potato Breeding.

Euphytica, Wageningen 1953 : 2 : 211-23.

An account is given of the work of the above commission in providing technical assistance to breeders, and maintaining farms for testing the yield of new crosses and their resistance to disease.

2194 CORDNER, H. B., STRUBLE, F. B., REDER, R. & MORRISON, L.

Redgold sweet potato.

Bull. Okla. agric. Exp. Sta. 1953 : No. B-411 : Pp. 7.

Another account of this variety and results of its performances in trials are given (cf. *PBA*, Vol. XXIII, Abst. 2814).

2195 KEHR, A. E. & YU CHEN TING

Cytological evidence concerning the evolution of *Ipomoea batatas*.

Genetics 1953 : 38 : p. 672. (Abst.).

From investigations at Louisiana State University, the authors have concluded that *I. batatas* is a hexaploid ($n = 45$) of comparatively recent origin, derived by amphidiploidy from a tetraploid ($2n = 60$) and a diploid species ($2n = 30$). During meiosis no multivalents have ever been found, but characteristic secondary associations involving 4-5 groups of 3 bivalents and 6-9 associations of 2 bivalents have been observed. The degree of association ranged from intimate juxtaposition to connexion of the bivalents by chromatic strands only. The type of secondary association observed was ascribed to homology between such minute segments that no chiasmata were formed, although sufficient affinity existed for attraction of the chromosomes at metaphase I.

2196 YU CHEN TING & KEHR, A. E.

Meiotic studies in the sweet potato.

J. Hered. 1953 : 44 : 207-11.

Varieties L 240 and L 9-32 were studied, 45

bivalents being formed. Since $x = 15$ appears to be the basic chromosome number of the Convolvulaceae, *I. batatas* would appear to be a hexaploid. Alloploidy was indicated by the occurrence of secondary association without multivalents. Meiotic aberrations were seen in L 9-32 but not in L 240, which explains the relative failure of L 9-32 to set seed.

- 2197 EHEART, J. F., MASSEY, P. H. (JUN.) & YOUNG, R. W.

Effect of variety on the ascorbic acid and carotene contents and on the yield of sweet potatoes.

Virginia J. Sci. 1953 : 4 : p. 210.

Of eight varieties which were studied with regard to ascorbic acid, carotene and moisture contents, first and total yields, colour and taste, B-5999, Allgold, B-5941 and Goldrush ranked first.

- 2198 STINO [ISTINU], K. R. & HASSAN, H. H.
Flower induction in sweet potatoes in Egypt.

Bull. Fac. Agric. Univ. Cairo 1952 (1953) : No. 23 : Pp. 28.

These studies were undertaken to facilitate breeding new types by hybridization. Five plants of 17 varieties were grown with plenty of space, air and light, two of each type being girdled. The plants were protected in the winter. Plants of all varieties except Yellow Jersey eventually flowered. Varieties varied in the period taken to commence flowering (chiefly 8 months to 2 years after planting), the length of the flowering period and the number of flowers and seeds produced. All produced more flowers and seeds as they became older. Girdling made no difference to the number of flowers produced. November and May were the peak flowering periods, most fruit being set in November though the maturing of the fruit took longer. The indication is that flowering is determined by genetical constitution, modified by environment. One hybrid of Wennop and Baladi [Local], two heavily flowering varieties, flowered when only six weeks old.

- 2199 TJUTIN, M. G.
(Biology of flowering and fertilization in the sweet potato).

Agrobiologija (Agrobiology) 1953 : No. 4 : 139-42. [Russian].

Most forms of *Ipomoea batatas*, investigated at Simferopolj, had a lower degree of fertility when selfed than after crossing.

- 2200 STINO [ISTINU], K. R. & HASSAN, H. H.
Flower formation of hard blooming sweet potato plants as affected by grafting.

Bull. Fac. Agric. Univ. Cairo 1952 (1953) : No. 24 : Pp. 11.

Grafts were made reciprocally between the rarely flowering seedlings 421 and 426 and Yellow Jersey, on the one hand, and the readily flowering types Baladi [Local], Wennop and seedling B-52, on the other. Stocks and scions of readily blooming types produced flowers on the expected dates. Scions of rarely blooming types produced flowers readily when grafted on to readily blooming types, indicating that there is a flowering stimulant, which passes upwards, produced in the latter.

- 2201 MURTHY, H. B. N. & SWAMINATHAN, M.
The nutritive value of different varieties of sweet potato.

Curr. Sci. 1954 : 23 : p. 14.

In tests conducted at Mysore, American orange-fleshed varieties were shown to have a higher carotene, protein and calcium content than local Indian white-fleshed varieties.

- 2202 COOK, H. T.

The fungi that cause rot in sweet potatoes.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 444-47.

Southern Queen, Triumph, Yellow Strassburg and Porto Rico are moderately resistant to *Fusarium oxysporium* f. *batatas*, and Southern Queen, Nancy Hall, Porto Rico, Big Stem Jersey and Triumph are moderately resistant to *Rhizopus nigricans*.

FIBRES

- 2203 HUA, H.-N.
(An inquiry into the problems of cotton breeding. I. A discussion of the basic concepts).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 2 : 1-3. [Chinese].

A short general discussion of the advances to be anticipated from varietal improvement and of the necessity of guarding against deterioration is presented.

- 2204 **Fifth Conference on cotton growing problems in India, March, 1952).**

Indian cent. Cott. Comm. Bombay 1953 : Pp. 116.

This account of the conference includes the remarks made by the authors on the chief points in the papers which each presented, plus the

discussion which followed. The majority of the papers have already been summarized.

Patel, G. B. 1. *Long staple cotton from hybrid seed of crosses between "hirsutum" and "barbadense" species.* (pp. 1-6).

Summarized in PBA, Vol. XXIII, Abst. 2073.

Ganguli, B. D. & Ganguli, P. M. 2. *Cotton in Assam.* (pp. 6-11).

Summarized in Abst. 1267.

Jagannatha Rao, C., Raghavan, A. & Appa Rao, P. 3. *A review of recent progress in the work of the evolution of jassid and blackarm resistant strains for the Tungabhadra project area.* (pp. 11-13).

Summarized in PBA, Vol. XXIII, Abst. 1322.

Bholanath. 4. *Colour of seed fuzz in Upland cotton with special reference to maintenance of purity of improved strains.* (pp. 13-15).

Green fuzz, which is found in samples of the strain Buri 107, is correlated with higher ginning percentage and lint length and lower seed size. Further investigations are being made by crossing selected lines of Buri 107, homozygous for fuzz colour and commercial mixtures.

Ganesan, D. 5. *Breeding for long staple by hirsutum x barbadense crosses—a suggestion on the line of work.* (pp. 15-17).

In order to develop a long-staple cotton suited to Indian conditions, selection of *G. hirsutum* and *G. barbadense* and of hybrids between these species is suggested. It is also suggested that the fittest type should first be obtained by means of natural selection before artificial selection for economic characters was made.

Jagannatha Rao, C., Marar, K. S. & Santhanam, V. 6. *A brief review of the cotton breeding problems in the Madras State with special reference to improvements in yield and quality.* (pp. 18-21).

Summarized in PBA, Vol. XXIII, Abst. 2820.

Ganesan, D. 7. *Interspecific hybridization of *G. thurberii* with cultivated cottons. A study in survival.* (pp. 21-22).

A tetraploid of the hybrid *Gossypium arboreum* x *G. thurberii* was crossed with *G. hirsutum* and an F₉ has been grown. Great variability of characters was found in the segregating generations. A concept of survival value based on the

ratio of the number of seeds harvested to the number sown showed that some progenies tended to become extinct while others increased.

Paranjape, V. N. 8. *The importance of cotton survey of eastern sub-Himalayan and hill tract regions of India and Burma.* (pp. 23-24).

Summarized in Abst. 2215.

Paranjape, V. N. 9. *Desirability of some marker genes for cotton varieties in Madhya Pradesh.* (pp. 25-27).

Mutant genes (1) no bracteole, (2) short branch and (3) pink tops are described and suggested as marker genes for improved varieties to prevent contamination.

2205 RAJULU, K. D.

A note on the performance of Central American *hirsutum* cotton types in India.

Indian Cott. Gr. Rev. 1953 : 7 : p. 308.

Most of the types grown seemed unsuitable to Indian conditions and only the results of trials carried out at Coimbatore, Madras are given. A few of these types have been used as parents, and back-cross progeny with UA 33 as the parent were vigorous, jassid resistant and long stapled.

2206 HUA, H.-N.

(The American Coker's Pedigree Seed Company).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 1 : 75-77. [Chinese].

An historical outline is given of the work on cotton breeding undertaken by the above firm.

2207 PARDO PASCUAL, M.

Resultados de un ensayo comparativo de variedades precoces de algodón en Zaragoza. (Results of a comparative test of early varieties of cotton in Zaragoza).

Bol. Inst. Invest. agron., Madr. 1953 : 13 : 323-73.

The two cottons which give the best results as regards early maturity in the Ebro basin in Spain are Chirpan and Esparta, both of which are deficient in lint length. Two varieties recently acquired from the USA, namely Hibreed and Paymaster, were compared with Chirpan and Security. Both American varieties were somewhat earlier than Chirpan and gave a greater proportion of their yield by the end of November; their ginning percentage was also higher, whereas the total yield of raw cotton was roughly equal in all four varieties.

2208 MA, S.-T. & WANG, Y.-C.

(Studies on the genetics of green-seeded American cotton and on the relation between green seed and various economic characters).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 2 : 95-106. [Chinese].

Green fuzz in Upland cottons grown in China is determined by a single dominant factor. It is not linked with fibre length, boll size or seed size, all of which are polymerically determined.

2209 YU, C.-P. & CHANG, T. S.

(Further studies on the inheritance of anthocyanin in Asiatic cottons).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 1 : 49-58. [Chinese].

An English version of this paper was abstracted in *PBA*, Vol. XIX, Abst. 382.

2210 GERSTEL, D. U.

On the influence of temperature on a genetic ratio.

J. Elisha Mitchell sci. Soc. 1953 : 69 : 84-85. (Abst.).

The leaves of all the hybrids of a cross between a tetraploid of *Gossypium arboreum* var. *sanguineum* and Upland (*G. hirsutum*) became discoloured and dropped off, the plants dying before the flowering stage. In the cross $4n$ (*G. arboreum* var. *sanguineum* x *G. herbaceum*) x Upland 171 the lethal character, symbolized as Rl_a (red lethal complementary), segregated according to the tetrasomic ratio of 5:1. Intensity of abnormal symptoms and the time of death could be modified by using different strains of Upland and by temperature.

2211 ABDUL HAMID KHAN & MUHAMMAD AFZAL

Breeding of high ginning varieties of American cotton in the Punjab.

Pakist. J. Sci. 1953 : 5 : 91-93.

Hybrids of the Punjab-American commercial varieties 4F, LSS, 238F, 124F, 199F and Lasani 4 with such exotic varieties as D and PL, BAR 7/6, N 17 and BAR SP 8A were made at Lyallpur in order to improve ginning percentage. All crosses gave a higher average yield than LSS and the staple length was higher than that of the local parent. Crosses between local varieties and D and PL gave the best results.

2212 GERSTEL, D. U.

Genetic segregation of allopolyploids in the genus *Gossypium*.

Genetics 1953 : 38 : 664-65. (Abst.).

Allopolyploids combining various species and

containing contrasted genetic markers were synthesized and crossed to recessive testers. The segregation ratios partly reflected known taxonomic relationships. Thus $4n$ *G. arboreum-herbaceum* gave tetrasomic ratios for pollen colour, anthocyanin pigmentation of the plant, leaf shape and the character "red lethal." The combination $4n$ *G. anomalum-arboreum* produced segregates only rarely. No segregation for anthocyanin pigmentation, pollen colour, corolla colour or leaf shape was obtained among 81 plants of *G. arboreum-thurberi*. The comparison of two ADD/ADD hexaploids, derived from combinations of *G. hirsutum* with *G. thurberi* and *G. raimondii*, respectively, was of special interest. In the *G. hirsutum-raimondii* hexaploid, segregation at the locus R_1 and the locus for leaf shape was relatively frequent, but rare in the *G. hirsutum-thurberi* hexaploid.

2213 SUN, F.-G. [SUN, F.-C.]

(The prospects for obtaining new artificially synthesized cotton species).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 1 : 83-90. [Chinese].

Recent work on interspecific hybridization of cotton and the production of amphidiploids is reviewed.

2214 SUN, F. & YANG, W.-H.

(Preliminary studies on problems concerning the hybridization, asexual propagation and transplantation of perennial cotton. Report on studies of Yunnan perennial cotton. IV.).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 2 : 67-72. [Chinese].

Data are given on the morphological characters and fibre quality of F_1 hybrids involving Wenshan, Kailien, Szuchu, Cheli, Tangüis and Kaili. Several combinations proved superior to the parent species.

2215 PARANJAPPE, V. N.

The importance of cotton survey of eastern sub Himalayas and hill tract regions of India and Burma—an old plea.

Indian Cott. Gr. Rev. 1953 : 7 : 297-303.

Cotton grown in peninsular India gives a good yield but presents little variability from which to breed. Results of trials including the hill type Ruma are given and show that it performs well when grown on the plains. The range of variability known to exist among cotton plants in the Assam-Burma region is surveyed.

- 2216 CHANG, T.-S. & CHANG, T.-L.
(**Genetical studies on mutants of American cotton**).
Chungkuo Mienyeh/Chin. J. Cott. 1948 :
1 : No. 2 : 83-94. [Chinese].

Four new mutants of Upland cotton are described. Yellow seedling (y), from strain I 1749-21, is a lethal character. Curly leaf-1 (Cu_1), from TSC 1-31, is a dominant leaf abnormality, somewhat similar to curly leaf-2 (Cu_2), from TSC 4-32 which is also a dominant character, the homozygote of which is lethal. Kingyang crinkled leaf-2 (V_{n2}^1), from TSC 1-32, may be a member of the crinkled leaf allelomorph series described by J. B. Hutchinson (cf. *PBA*, Vol. XVI, Abst. 1973); its segregation ratios are aberrant, possibly because of modifiers. No linkages were found between any of the mutants described and other genes. Kingyang crinkled leaf-2 is an allele of Kingyang crinkled leaf-1 (V_{n1}^1).

- 2217 WANG, P.-S.
(**Introducing two new strains of cotton. Chintahsipei 8 and 517**).
Chungkuo Mienyeh/Chin. J. Cott. 1948 :
1 : No. 2 : 107-08. [Chinese].

Two new strains of Stoneville 4 selected at the Northwestern Experimental Station of Nanking University are described. Chintahsipei 8 [Northwestern Station of Nanking University 8] differs from the parent variety in its higher yield and larger bolls; Chintahsipei 517 is an early strain, also yielding more than the parent type.

- 2218 CHANG, T.-L.
(**Ecological investigations on perennial cotton in Shensi. Report on studies of Yunnan perennial cotton. VI.**).
Chungkuo Mienyeh/Chin. J. Cott. 1948 :
1 : No. 2 : 79-82. [Chinese].

A series of normal perennial cottons and one connate-seeded sample were sent from Yunnan to Shensi for observation. Data are given on flowering dates, habit, plant height and boll formation under Shensi conditions.

- 2219 WARE, J. O., WADDLE, B. A., HUGHES, C. & JACKS, J. F.
Cotton experiments in northeast Arkansas during 1953.
Mimeogr. Ser. Ark. agric. Exp. Sta.
1954 : No. 21 : Pp. 9. (Mimeographed).

In the commercial variety tests, Deltapine 15 appeared best and showed some tolerance of *Verticillium* wilt. Varieties adapted to the

Delta were not injured by Chloro IPC or Di-Nitro but CMV caused serious damage to all except Stoneville 2B.

- 2220 FINKNER, M. D.
Random activity of pollen vectors in isolated plots of Upland cotton.
Agron. J. 1954 : 46 : 68-70.

The following three lines of evidence, obtained from experiments in N. Carolina, indicate that the activity of pollen vectors in effecting cross pollination of cotton is random: (1) the experimentally obtained frequency of natural crossing of Red Leaf stock (*RRVV*) on Green leaf (*rrVV*) did not deviate significantly from the expected frequency of a normal distribution; (2) using the same stocks, differences in the amount of natural crossing between rows and between plants within a row were not significant; and (3) the proportion of plants of Red Leaf and Green Leaf immediately surrounding Virescent Yellow (*rrvv*) plants did not have a significant influence upon natural crossing of the last named stock.

- 2221 FINKER, M. D.
An evaluation of genetic differences with respect to natural crossing in Upland cotton.
Agron. J. 1954 : 46 : 70-75.

Experiments reported elsewhere have shown that the activity of pollen vectors in bringing about cross pollination occurs at random (cf. Abst. 2220). Tests of the stocks Red Leaf, Green Leaf and Virescent Yellow, carried out in two localities in North Carolina during 1950, indicated the existence of interstock differences in natural crossability other than those due to disparities in flower production. For neutralizing the effects of variable flowering distributions, the reciprocal of the proportion of flowers from which pollen was available was employed as the weighting factor. Virescent Yellow underwent a considerably greater amount of crossing than the other two stocks. In the case of pollen from Red Leaf, a significant stock x environment interaction was detected. The data obtained at one centre provided some evidence of an interaction between stock and flowering period.

- 2222 STEPHENS, S. G.
The breeding system in cotton and its possible significance in methods of cotton improvement.
J. Elisha Mitchell sci. Soc. 1953 : 69 :
86-87. (Abst.).

Tests on the frequency of natural crossing in cotton in the United States have indicated the

occurrence of (1) a variation ranging from less than 5% in Texas to more than 50% in North Carolina, (2) little seasonal variation in any one locality, (3) considerable variation between the early and peak flowering periods in any one season, and (4) marked intervarietal differences. It is suggested that if the residual hybridity maintained during the successive seasons of open pollination during seed multiplication results in residual heterosis, the selection of strains on the basis of their combining ability, in addition to other attributes, merits further attention.

2223 GREEN, J. M.

Sub okra, a new leaf shape in Upland cotton.

J. Hered. 1953 : 44 : 229-32.

A leaf shape termed sub okra was found to be due to a simple gene which belongs to the series consisting of l^o (round), L^o (okra) and L^s (super okra). The gene has therefore been designated L^u . It is believed to be derived from *Gossypium thurberi*.

2224 BHAT, N. R. & KHATTAR, K. D.

A curled-leaf mutant in herbaceum cotton.

Curr. Sci. 1953 : 22 : 347-48.

A curled-leaf mutant of variety 2087 was crossed with the normal type at the Surat Agricultural Research Station. The mutant was found to be determined by a single recessive gene. Crossing experiments with a similar curled-leaf mutant in 1027-A.L.F. showed that both mutants were determined by the same gene (cf. *PBA*, Vol. X, Abst. 290).

2225 NAYAR, K. V. N.

A prediction formula for estimating the spinning value (H.S.W.C.), of American cottons grown in Malwa from their fibre properties.

Indian Cott. Gr. Rev. 1953 : 7 : 283-91.

Correlation coefficients between the highest standard warp counts and (1) mean fibre length (2) mean fibre weight per unit length and (3) percentage of irregular fibres, were calculated, and from these the two new regression equations given were derived. These equations and those obtained by Hari Rao Navkal and Sen were applied to 71 cotton varieties grown at Malwa. The new formulae gave the best predictions for spinning value. The properties studied accounted for 36% of the spinning value, though only fibre length was significantly correlated with it. For the remaining 64%, the strength factor is considered important.

2226 HSI, Y.-L. & CHEN, J.

(Studies on the growth habit, yield and quality of perennial cotton. Report on studies of Yunnan perennial cotton. I.).

Chungkuo Mienyeh/Chin. J. Cott. 1948 : 1 : No. 1 : 10-19. [Chinese].

Two types of perennial cotton occur in Yunnan, (1) a widely distributed form with connate seeds but of no economic importance, and (2) a form resembling Egyptian cotton and believed to be of comparatively recent introduction. Data are given on the physiological and agronomic characteristics of the latter. Pedigree selection is being practised to obtain greater uniformity in fibre length.

2227 FIKRY, M. A.

Cotton breeding in Egypt.

Pakist. J. Sci. 1953 : 5 : 144-47.

An historical survey of cotton cultivation in Egypt is presented, together with an account of the origins of types at present grown. Selection and intervarietal hybridization have led to better quality lint, higher ginning percentages and improved resistance to diseases and insect pests. Increased yield remains the main problem, and it is suggested that better results in this direction may be achieved by interspecific hybridization and the introduction of further *Gossypium barbadense* forms from South America and the West Indies.

2228 SMITH, A. L.

Anthraxnose and some blights.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 303-11.

The cotton varieties Toole, Dixie, Dillon, Express, Rowden, Cleveland and Deltapine are moderately resistant to the pink boll rot phase of anthracnose. Empire, Deltapine 15 and Stoneville 2B appear slightly more resistant than other varieties to stem canker caused by *Ascochyta*. Breeding work on resistance to *Xanthomonas malvacearum* is described.

2229 SUBRAMANIAN, V. K.

Drought resistance of cotton.

Indian Cott. Gr. Rev. 1953 : 7 : 279-82.

Assuming that a decrease in transpiration under arid conditions is an indication of drought resistance, Dharwar 2-3-41, and Hairiness grades 2 and 4 may be considered drought resistant.

2230 BLANK, L. M.

The leaf spots of cotton plants.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 315-17.

The noncommercial cotton variety Stoneville

20 is resistant to *Xanthomonas malvacearum* and is being used to obtain resistant commercial varieties.

2231 KALYANARAMAN, S. M.

Progress of cotton research in Madras.

Madras agric. J. 1954 : 41 : 3-14.

The distribution of and the growing conditions suitable for each of the following varieties are described, together with an account of the breeding for yield, quality and disease resistance which is taking place: Cambodia, Nadam, Karunganni, Tinnevelles, Cocanadas, Westerns and Northern. New World wild cottons *Gossypium darwinii* and *G. taitense* and Asiatic cottons *G. raymondii* and *G. anomalum* are being used for improving Cambodia. A few of the hybrids derived are highly resistant to *Phytophthora malvacearum*. Inheritance studies have shown that short lint is a monogenic character and that immaturity of lint in relation to lint length depends on two factors. A gene for maturity is present in the lintless type but is not expressed. Cleistogamy is a simple recessive.

2232 PRESLEY, J. T.

Verticillium wilt of cotton.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 301-03.

Varieties Acala 4-42 and Acala 1517 WR are tolerant of *Verticillium*. *Fusarium* resistant varieties yield comparatively well on soil infected with *Verticillium*.

2233 Search fails to uncover cotton strains resistant to verticillium wilt.

What's New Crops Soils 1953 : 6 : No. 3 : p. 22.

Some varieties tested at the Arkansas Agricultural Experiment Station gave satisfactory yields in spite of susceptibility to wilt, and from these, tolerant varieties may be developed.

2234 SMITH, A. L.

Fusarium and nematodes on cotton.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 292-98.

The breeding of varieties resistant to *Fusarium oxysporum* f. *vasinfectum* and the root knot nematode is described.

2235 MUHAMMAD AFZAL & GHANI, M. A.

Cotton jassid in the Punjab.

Sci. Monogr. Pakist. Assoc. Advanc. Sci., Lahore 1953 : No. 2 : Pp. 101.

The varieties 4F, LSS, 289F/43 and 199F showed most resistance. Resistance was due to factors which prevented oviposition, as hatching

and development of the larvae occurred equally well on resistant and susceptible varieties. Leaf characters correlated with resistance were moisture percentage, hairiness and toughness of the leaf veins. It is suggested that grades 1 and 2 for stem-tip hairiness proposed by Hutchinson *et al* (cf. PBA, Vol. IX, Abst. 930) should be classified as resistant. Hairiness is correlated with but not responsible for resistance as shaved leaves remain resistant.

2236 KNIGHT, R. L. & SADD, J.

The genetics of jassid resistance in cotton. III. The Kapas Purao, Kawanda punctatum and Philippines Ferguson group.

J. Genet. 1954 : 52 : 186-98.

Two varieties of Upland cotton (*Gossypium hirsutum*), viz. Kapas Purao and Philippines Ferguson, and a strain of *G. hirsutum* var. *punctatum* of unknown origin from Kawanda, Uganda, have each been found to carry a major gene at the locus H_1 for hairiness. This gene is, however, so closely linked with chl_1 , one of two complementary factors for chlorophyll deficiency that transference of it to Sakel (*G. barbadense*), which contains chl_2 , the other factor for chlorophyll deficiency, cannot result in strains homozygous for hairiness. This allele at H_1 has been designated H_1^k . Probably the H_1^k - chl segment of the chromosome is inverted in relation to the H_1 - Chl segment in Sakel and other *G. barbadense* cottons, and also in relation to the H_1 - chl_1 segment in MU 8b and other *G. hirsutum* varieties. In addition to H_1^k , Philippines Ferguson possesses minor H genes for hairiness, modifiers which increase hair length and negative modifiers which reduce hair density.

2237 KNIGHT, R. L.

The genetics of jassid resistance in cotton. IV. Transference of hairiness from Gossypium herbaceum to G. barbadense.

J. Genet. 1954 : 52 : No. 1 : 199-207.

A major gene for hairiness has been transferred from Wagad 8 (*G. herbaceum*) to Sakel (*G. barbadense*) and was found to be identical with H_1 , the key gene usually responsible for hairiness in New World cottons. The gene H_1 is linked with chl_1 for chlorophyll deficiency in the New World cottons (cf. Abst. 2236): since H_1 is of Old World origin, chl_1 must also have a similar origin, both genes belonging to genome A. In addition to H_1 , Wagad 8 contains minor H genes and positive modifiers affecting hair length.

- 2238 KING, H. E.
Cotton and cotton breeding.
 Proc. Conf. Dep. Agric. Samaru, Nigeria
 14-18 Jan., 1952 : 8-10.
 In an account of cotton growing in Africa,
 resistance to disease and adaptation of varieties
 to local conditions in Nigeria are mentioned
 briefly.
- 2239 WARE, J. O. & HUGHES, C.
**Arkansas coastal plain cotton variety
 test for 1953.**
 Mimeogr. Ser. Ark. agric. Exp. Sta. 1954 :
 No. 19 : Pp. 5. (Mimeographed).
 The yield, staple length and ginning percentage
 of the varieties tested are tabulated. Empire
 WR, Stoneville 62-84, Hale (D and PL) 33
 and D and PL Fox were among the better
 early-maturing varieties. Deltapine 15, Hale
 (D and PL) 33 and Stoneville 62-84 have a
 high ginning outturn. Comparative yields of
 the varieties Stoneville 2B, Deltapine 15, Coker
 100 Wilt, Bobshaw 1A and Empire WR, which
 have all yielded satisfactorily, are given for a
 five-year period.
- 2240 WARE, J. O. & HUGHES, C.
**Eastern Arkansas cotton variety tests
 for 1953.**
 Mimeogr. Ser. Ark. agric. Exp. Sta. 1954 :
 No. 20 : Pp. 7. (Mimeographed).
 The results of trials for boll size, ginning out-
 turn and staple length are given. The best
 varieties for ginning outturn were Deltapine 15
 and Hale (D and PL) 33; for large bolls Empire
 WR, Delfos 9169 and Stoneville 2B; and for
 staple length Delfos 9169, Arkot 2-1 and Coke
 100 Staple.
- 2241 **Choice of variety in the supply of
 seed for flax cultivation.**
 Windmill, The Hague 1953 : No. 12 :
 p. 18; also in French, p. 16; in German,
 p. 17; and in Spanish, p. 19.
 Changes in flax varieties in the Netherlands
 during the past decade are briefly discussed.
- 2242 YEH, S.-F.
**(Studies on the technique of field
 experiments with flax).**
 Taiwan Tahsueh Nunghsuehyuan
 Yenchiu Paokao/Mem. Coll. Agric.
 Taiwan Univ. 1953 : 2 : No. 5 : 35-64.
 [Chinese].
 A uniformity trial with the variety Ireland in
 flax is described; the air-dried stems from
 1 m. lengths of each row were weighed for
 statistical analysis. The optimum plot size was
 8-16 m. x 1-6 rows. The best arrangement of
 plots within the block can be ascertained by
 using serial correlation coefficients to determine
 the direction of the over-all fertility gradient.
 A formula is derived for estimating the number
 of replications necessary according to number
 of treatments, experimental design, and level of
 significance required in the statistical tests.
- 2243 ONO, R.
**(Flax tetraploid produced by
 colchicine treatment).**
 Senshokutai (Chromosome)/Kromosomo
 1952 : Nos. 12-13 : 490-93. [Japanese].
 A description of the morphology and cytology
 of colchicine-induced flax tetraploids is given.
 The tetraploids had thicker leaves and larger
 petals than the diploids. Sterility was high,
 and some quadrivalents were observed at
 meiosis.
- 2244 WRICKE, G.
 Die Manifestierung der erblich bedingten
 Polyembryonie beim Lein in inhrer
 Abhängigkeit von Aussenfaktoren. **(The
 manifestation of hereditarily con-
 ditioned polyembryony in flax in its
 dependence upon external factors).**
 Biol. Zbl. 1954 : 73 : 49-88.
 In fibre flax, genetically determined poly-
 embryony is due mainly to the splitting of the
 young embryo and the further development of
 the haploid cells of the embryo sac. It is also
 largely conditioned by external cultural con-
 ditions, such as the amount of water, calcium
 and nitrogen in the soil.
- 2245 RATAJ [RATAJ], K.
**(The question of early sowing in
 relation to winter hardiness of flax).**
 Za socialist. seljskohozjaistv. Nauk. (For
 socialist agric. Sci.), Praha 1953 : Ser. A :
 Nos. 2-3 : 226-47. [Russian].
 Agricultural methods of reducing the effects of
 frost upon flax are discussed. Of several
 varieties tested in Czechoslovakia, Liral
 Monarch, Šumperský Textilák and Šumperský
 Emný proved the hardest.
- 2246 FLOR, H. H.
Wilt, rust and pasmo of flax.
 Plant Diseases. Yearb. Agric. US Dep.
 Agric. 1953 : 869-73.
 Resistance to *Fusarium lini*, *Melampsora lini*
 and *Septoria linicola* is discussed. Tolerant
 and resistant varieties are mentioned.

2247 MILLIKAN, C. R.

Diseases of flax and linseed.

Tech. Bull. Dep. Agric. Vict. 1951 : No. 9 : Pp. 140.

Rust—*Melampsora lini* (Pers. Lev.). (pp. 1–16).

The reactions of differential varieties to the 15 races of *Melampsora lini* found in Australia are given. Wada is a rust-resistant selection from Riga Crown and where rust is prevalent it gives a superior yield to susceptible varieties. A new race O, however, was found attacking Wada in Western Australia.

Wilt—*Fusarium lini* (Bolley). (pp. 16–33).

Russian x Argentine CI 896 has been chosen as the principal parent for breeding flax varieties resistant to *Melampsora lini* and *Fusarium lini* under Victorian conditions. The selection of resistant strains from susceptible varieties has had some success. Nine races of *F. lini* have been isolated in Australia. Experiments to show the comparative virulence of these races and others from America on different varieties have been carried out.

Pasco—*Sphaerella linorum* (Wollenw.). (pp. 34–39).

S. linorum, when sprayed on to enclosed plants, caused very light lesions on the varieties Bison, Novelty and Russian and the cross JWS x Bison.

Stem break and browning—*Polyspora lini* (Laff.). (pp. 54–63).

Varieties which have shown resistance to *P. lini* are Winona, Ottawa 770B, Redwing, Rio, Morocco, La Plata, Hercules, Concurrent and Hindi, and the cross Saginaw x Ottawa 700B.

Seedling blight or anthracnose (Colletotrichum *linicola* (Pethybr. & Laff.)). (pp. 63–68).

Varieties Linota, Buda 80, CI 1008, CI 1009, Bison, Hindi and La Plata have proved resistant to *C. linicola*.

Withertop (Calcium deficiency). (pp. 73–83).

Liral Crown Selection 13 has shown promising resistance.

Frost injury. (pp. 129–33).

The linseed varieties Rowan Winter, Rio, Rigor and Bolley's Golden are more tolerant of low temperatures than are fibre flaxes.

2248 **Flax variety trials, 1950–52.**

J. nat. Inst. agric. Bot. 1953 : 6 : 475–88.

The Dutch varieties Percello and Hollandia

were compared with Liral Prince and Stormont Motley in trials in England. Percello showed the most satisfactory field behaviour, possessing good vigour, satisfactory straw length and high resistance to lodging and rust. It also gave the highest yield of fibre and seed.

2249 **Vezelvas, 1954. (Fibre flax, 1954).**

Landbouwwoorlichting 11 : Bijl. 12; Ber. Rassenkeuze No. 1641 : 954 : unpaginated.

Data on yields of seed and fibre of eleven varieties tested on different types of soil in the Netherlands are presented. Solido and Wiera gave the highest yields of seed on all types of soil, and Wiera, Formosa and Diana gave the highest yields of straw.

2250 **MATUSIEWICZ, E.**

Studia nad fotoperiodyzmem konopi. (Studies on the photoperiodicity of hemp).

Prace Kom. Nauk roln. leśn., Poznań 1953 : 2 : No. 2 : Pp. 81.

The effect of day length on the growth, development and morphological characteristics of hemp was studied in the Italian variety Ernesto Pini 1, four hems grown in Poland, others from Vilnius, Sweden and Bologna, and a wild hemp. In all, short day inhibited the vegetative processes and hastened the onset of generative development. On an average the ♀ plants flowered five days before the ♂ plants. A small number of short photoperiods, though accelerating the onset of reproduction, does not completely inhibit the vegetative phases; in fact, growth is stimulated. The application of 10–25 short photoperiods causes the plants to flower twice in one season.

Short day decreased the interval between sowing and ripening and also the yield of seed to $\frac{1}{2}$ – $\frac{3}{4}$ of the yield from the control, but 1000 seed weight and germination capacity were satisfactory.

2251 **GUHA, A. K.**

Analytical studies of control and mutant jute fibres.

Sci. & Cult. 1953 : 19 : p. 262.

The fibres of an X-ray-induced tall mutant of *Corchorus olitorius* had higher contents of lignin, α -cellulose, furfural and polyuronide but a lower content of hemicellulose than the parent strain used as control. The mutant and control samples showed only a negligible difference in holocellulose content.

2252 ABDUL JABBAR MIA

A preliminary comparative study of the growth and development of some cultivated and wild jute plants of East Bengal.

Pakist. J. sci. Res. 1953 : 5 : 53-57.

Corchorus capsularis 'Fanduk', *C. capsularis* 'D 154', *C. olitorius* '040-632', *C. olitorius* 'CG', *C. trilocularis* and *C. acutangularis* were compared with regard to sowing time; percentage germination; rate of growth of the whole plant, internodes and leaves; and variation in behaviour during growth and development up to flowering time and the effect of environmental factors.

2253 PATE, J. B., SEALE, C. C. & GANGSTAD, E. O.

Varietal studies of kenaf, *Hibiscus cannabinus* L., in south Florida.

Agron. J. 1954 : 46 : 75-77.

On both peaty soil and fine sand the commercial El Salvadorian variety was superior in fibre yield to the other three varieties tested, viz. two Javanese introductions and Tingo María. Fibre quality was significantly affected by soil type and method of extraction but not by variety.

2254 KUWADA, H.

(On differences in physiological and ecological characters between amphidiploids obtained by breeding and the parent plants. IX. The relations between seed germination and the structure of the testa).

Ikushugaku Zasshi/Japan. J. Breeding 1952 : 2 : 42-46. [Japanese].

Differences in the percentage germination of *Abelmoschus esculentus*, *A. manihot* and the amphidiploid hybrid of these two species after especially dry or after normal storage conditions (cf. Abst. 1284) are associated with different staining reactions to phloroglucin on the part of the cell walls of the testa palisade cells.

2255 LÓPEZ, H., R. & LOEGERING, W. Q.
Resistencia de variedades de abacá (*Musa textilis* Nee) a la mancha de la hoja y pérdidas ocasionadas por la enfermedad. [Resistance of abacá varieties (*M. textilis* Nee) to brown leaf spot and the loss caused by the disease].

Turrialba 1953 : 3 : 159-62.

The symptoms caused by brown leaf spot are

similar to those caused by *Helminthosporium torulosum* on banana. The reactions of the varieties Bungulanon, Libuton, Maguindanao, Tangongon and Putian to the fungus were tested. Putian was the most resistant.

2256 SAITO, K.

(Studies on the induction and utilization of polyploidy in some cucurbits. I. On polyploids of *Luffa cylindrica*).

Ikushugaku Zasshi/Japan. J. Breeding 1953 : 2 : 147-49. [Japanese].

Colchicine-induced tetraploids of *L. cylindrica* and triploids obtained by crossing these with diploids are described. The tetraploids are of interest on account of their stronger fruit fibres, but are late-maturing, genetically variable and reduced in fertility.

2257 NAKAHIRA, K.

(Studies on breeding trees for special purposes. II. On the fertility of *Edgeworthia papyrifera*).

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 150-52. [Japanese].

The varieties Shizuoka and Kochi were found to be self sterile. Intravarietal pollination showed, however, that Shizuoka was cross fertile, while Kochi, an asexually reproducing form, is cross sterile. Seed was set in both direct and reciprocal crosses of Shizuoka x Kochi.

SUGAR AND STARCH PLANTS

2258 MYATT, O. W. D.

N.Co.310 in the Bundaberg district.

Cane Gr. quart. Bull. 1954 : 17 : 104-05.

In view of proposed distribution of the South African variety N:Co. 310 (cf. *PBA*, Vol. XVI, Abst. 561) in the Bundaberg district of Queensland, a description of the variety is provided. Its chief advantages are its high degree of frost resistance and the good quality it maintains during the earlier months of harvesting.

2259 KING, N. J.

List of varieties of sugar cane approved for planting, 1954.

Cane Gr. quart. Bull. 1954 : 17 : 106-07.

KING, N. J.

Approved fodder canes.

Ibid. 1954 : 17 : p. 108.

Varieties for sugar production and fodder purposes, approved for planting in the different districts of Queensland, are listed.

2260 CHEVALIER, A.

Les publications récentes de la Revue Internationale de Botanique Appliquée et les améliorations de la canne à sucre. (**Recent publications of the Revue Internationale de Botanique Appliquée and improvements in the sugar cane**).

Rev. int. Bot. appl. 1953 : 33 : 389-91.

HALAIS, P.

Enseignements agricoles d'une mission aux Antilles à l'occasion du VIII^e Congrès International des Techniciens de la Canne et du Sucre. (**Agricultural information from a mission to the Antilles on the occasion of the 8th International Congress of Sugar Cane Technologists**).

Ibid. 1953 : 33 : 392-403.

The first of the above papers is a brief historical note on the contribution of the *Revue Internationale de Botanique Appliquée* to the advance of research on tropical crops, special reference being made to the report by P. Halais on his mission to the Antilles, already summarized from another source (cf. Abst. 1289).

2261 SARDONE, L. T.

Sugar cane breeding in Australia.

World Crops 1954 : 6 : 147-48.

A short popular account of past and present sugar-cane breeding in Australia is given.

2262 RIVER, H.

Q50 in Ingham area.

Aust. Sug. J. 1954 : 45 : p. 755.

The Q 50 sugar cane has given favourable results under adverse conditions in the Ingham area of Australia. It is considered that it will perform well on the dry, poorer soils.

2263 LOH [Lo], C. S., TSENG, P. M. & HU, T. H.

(**Hybrid vigour in sugar-cane hybrids**).

Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 17-38. [Chinese].

Studies are reported on the mode of inheritance of tiller number, cane diameter and stool height in a series of crosses made at Pingtung, Taiwan. Prolific tillering is a dominant character, but is inherited far more readily via the female parent; it shows transgressive inheritance in the F₂. Narrow diameter of the cane is dominant to stoutness. Diameter is negatively correlated with tiller number and is also more strongly affected by the female than by the male parent. Stool height is strongly influenced by environmental conditions, but some evidence was

obtained that tall habit tends to be dominant to short and that stool height is affected more by the male parent than the female.

2264 (**The rearing of the superior sugar-cane varieties of the P.T. 48 series**).

Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 115-24. [Chinese].

Seedlings resulting from hybridizations effected in 1948 at the Pingtung research station, Taiwan, are classified in respect of morphological characters, yield, quality of the juice, earliness, disease resistance, suitability for interplanting with rice, and adaptability to infertile soils.

2265 TAKIZAWA, S.

(**Chromosome constitution of *Miscanthus***).

Senshokutai (Chromosome)/Kromosomo 1952 : No. 14 : 509-17. [Japanese].

Chromosome numbers are reported as follows: *M. sinensis*, $n = 19$; *M. japonicus*, 19; *M. sacchariflorus*, 38; and *M. tinctorius*, 38 and 57. Aneuploids also occurred frequently. It is presumed that $n = 19$ is a secondary basic number since (1) $n = 10$ is the basic number in related genera; (2) studies of chromosome morphology revealed some reduplication; and (3) secondary association is common.

2266 COLEMAN, R. E.

The effect of dry storage before planting on the germination of sugar-cane cuttings.

Sug. Bull., N. Orleans 1953 : 32 : 87-90.

Cuttings of the varieties CP 29-230 and CP 36-105, which can change sucrose to glucose more rapidly than CP 44-101 and CP 44-155, also show a steeper rise in germination percentage after storage.

2267 BUZACOTT, J. H.

A problem in cross-pollination.

Cane Gr. quart. Bull. 1954 : 17 : 109-10.

In sugar-cane crossing at the Meringa Experiment Station, Queensland, time of flowering is adjusted as required by cutting back the leaves or by changes in day length.

2268 CHILTON, S. J. P. & MORELAND, C. F.

Experiments on the flowering of sugarcane.

Sug. Bull., N. Orleans 1954 : 32 : 165-69.

Some plants of the varieties CP 29-116, 34-120, 36-13, 36-105 and 44-101 and Co. 290 were subjected in May to dark periods which were gradually lengthened and other plants were similarly treated in August. Floral initials were formed by the plants under treatment at both periods of the year.

- 2269 Mok, B. C. [Mo, P. C.] & Kwo [Kuo], C. Y.
(Observations on the flowering and seed setting of sugar cane at Puli, a mountainous site in Taiwan. I.).
 Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 39-50. [Chinese].
 Further to a paper by the senior author on arrowing at Puli, a montane site in Taiwan (cf. Abst. 1298), it is shown that the more profuse arrowing at Puli is followed by a poor seed set. The comparatively low temperature and heavy spring rain at Puli are believed to be responsible for the reduced set.
- 2270 ETHIRAJAN, A. S.
Pollen grains in *Saccharum* and certain allied genera.
 Curr. Sci. 1953 : 22 : 385-86.
 Pollen grains of *Sclerostachya fusca*, *Narenga porphyrocoma*, *Erianthus arundinaceus*, *Saccharum robustum*, *S. officinarum*, *S. spontaneum*, *S. barberi* and *Saccharum* hybrids have been studied. Differences in diameter were significant at the 5% level except between those of *Narenga* and *Erianthus*. There is an indication of a correlation between chromosome number and pollen grain diameter. *Narenga* pollen grains were ovoid and the rest spherical, indicating *Narenga* to be well removed taxonomically from *Saccharum*.
- 2271 VISO RODRÍGUEZ, A.
 Efecto de diferentes soluciones conservadoras sobre la fertilidad del polen de panículas de caña de azúcar. **(Effect of different preserving solutions on the fertility of the pollen of panicles of sugar cane)**.
 Agron. trop., Venezuela 1953 : 2 : 259-60.
 Water, 3% formic acid, 1% sulphurous acid and a 1% mixed solution of sulphurous and phosphoric acids were tested as preserving solutions. Pollen remained fertile in water and formic acid for five days and in the others for ten days, though a higher percentage of fertile pollen was obtained from the mixed solution. The flowers collapsed after 7 days in all solutions but the panicles remained alive for the longest period in the mixed solution.
- 2272 D'EMMEREZ DE CHARMOY, D.
 Études sur de nouvelles variétés de canne à sucre à l'Ile de la Réunion. **(Studies on new sugar cane varieties in Réunion)**.
 Agron. trop., Nogent 1953 : 8 : 417-26.
 An historical account of the introduction and development of the principal varieties cultivated is given. At the present time, M 134/32, R 337, R 331 and Co. 419 give the highest yields and are the most widely grown varieties. Other canes showing promise are R 366, R 380, R 386, R 387, B 34/104 and B 37/161. Data on the yield, sugar content and purity of sugar of a number of local and foreign varieties are tabulated.
- 2273 ALMEIDA, J. R. DE, ET AL.
 O florescimento na variedade de cana Co-331 (Co-3X). **[Flowering in the cane variety Co-331 (Co-3X)]**.
 Ann. Esc. Agric. Queiroz 1952 : 9 : 157-74.
 Juice analyses at different periods indicated that the sugar cane in question, in spite of its early development and flowering, comes to factory maturity late and reaches its maximum sugar content 3-4 months after the emergence of the inflorescence.
- 2274 ABBOTT, E. V.
Sugarcane and its diseases.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 526-35.
 Sources of resistance to the common diseases are mentioned.
- 2275 LOH [LO], C. S., TSENG, P. M. & HU, T. H.
(Studies on cortical hardness in sugar cane stalks).
 Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 167-90. [Chinese].
 Anatomical investigations of sugar cane varieties and related species have shown that three types of hard stems occur: (1) the bamboo type in which sclerenchyma occurs around the vascular bundles and in heart-shaped masses between them; (2) the *Saccharum narenga* type, in which the vascular bundles are closely packed peripherally and frequently confluent; and (3) the *S. robustum* type, in which the sclerenchyma occurs in an almost continuous band connecting the peripheral vascular bundles. For breeding to resist wind-breaking, lodging and rat-gnawing, the *S. narenga* type of hardness is to be preferred.
- 2276 LOH [LO], C. S., TSENG, P. M. & TANG, C. K.
(Studies on cortical hardness in sugar-cane stalks. II. Causal morphology and grading or hardness).
 Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 227-47. [Chinese].
 A method of rating cortical hardness on the basis of the hardness of the internodes in the region of the stalk bearing mature green leaves

is described. A table is given of the hardness rating of important commercial and breeding varieties, and preliminary data are presented on the mode of inheritance of hardness in wide crosses involving commercial varieties, on the one hand and *Saccharum narenga*, *S. robustum*, *Miscanthus japonicus* or maize, on the other.

- 2277 **Report of the Experiment Station Committee of the Hawaiian Sugar Planters' Association, October 1, 1952 to September 30, 1953 (1953) :** Pp. 77.

A report is given of breeding carried out at regional variety stations. The canes 37-1933, 38-2915 and 44-3098 are setting high standards and other promising varieties are under trial. A list of élite parent varieties is given, of which 39-7028 and 44-3098 are considered best. Promising foreign parents are mentioned. Preliminary results of tests in Fiji show that the Hawaiian varieties 32-8560, 37-193 and 37-7202 are resistant to downy mildew. Symptoms of ratoon stunting were observed on 47-4991 and 47-112 and later on commercial varieties. Leaf scald has appeared on the previously resistant 44-3098 variety. Varieties 37-1933 and 44-3098 had the longest fibres.

- 2278 LO, T. T.
(**Black rot of sugar cane**).
Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 11-16. [Chinese].

In inoculation tests at Pingtung, Taiwan, F 108 appeared to be the variety most resistant to *Ceratostomella adiposum*.

- 2279 YEN, W. Y. & CHI, C. C.
(**Studies on leaf blight of sugar cane. I. The discovery of the life history of the fungus causing the disease**).
Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 191-215. [Chinese].

The perfect stage of *Cercospora taiwanensis* has been identified as *Leptosphaeria taiwanensis*. Among the varieties most resistant to this disease in Taiwan are POJ 2725 and F 29-453.

- 2280 LING [LIN], K. C.
(**Studies on leaf scorch of sugar cane. I. The distribution of leaf scorch in Taiwan**).
Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 125-45. [Chinese].

Further details are given of the susceptibility of Taiwan varieties to *Stagonospora sacchari* (cf. Abst. 1305).

- 2281 ABBOTT, E. V.
Red rot of sugarcane.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 536-39.
Varieties CP 36/105, CP 44/101, CP 44/155 and CP 36/111 are resistant to *Colletotrichum falcatum*.

- 2282 JU [CHIU], L. S.
(**The distribution of *Coleophora* and the amount of damage caused by it in each district**).
Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 51-62. [Chinese].

Varietal differences in the degree of infestation of sugar cane by the leaf miner in Taiwan are reported. Freedom from heavy infestation was associated with (1) compact tissue in the midrib, and (2) spreading leaves making an angle of ca. 30° with the ground.

- 2283 BRUEHL, G. W.
Strains of sugarcane mosaic in Puerto Rico.
Plant Dis. Repr. 1953 : 37 : 479-82.

Evidence has been obtained that several strains of mosaic occur in Puerto Rico. Several of the virus collections resulted in symptoms resembling those produced by strains A, B, C or D which exist in the mainland of the United States, but others showed no correspondence with American strains. The reactions of five sugar-cane varieties when inoculated with groups A, B and C-D showed general agreement with field observations on varietal reaction to mosaic in Puerto Rico. Strain B, however, predominated under field conditions, whereas strain A was more infective in the inoculation tests. Cane H 32-8560 exhibited the lowest percentage of infection to all three groups of strains.

- 2284 KING, N. C.
Chlorotic streak of sugarcane in Natal.

Exp. Sta. S. Afr. Sug. Assoc. 1953 : Pp. 4.
At the Experiment Station of the South African Sugar Association, most varieties grown appeared to be fairly resistant to the above disease except N : Co 310. Whether Co 281 and N : Co 339 are resistant is uncertain.

- 2285 KING, N. C.
Results of mosaic tolerance trials.
Proc. 27th Ann. Congr. S. Afr. Sug. Tech. Ass. Durban, Mt. Edgecombe 17-20 March, 1953 : 120-28.

Mosaic had least effect on the yield of Co. 281, Co. 201 and N : Co. 291. In N : Co. 339 there

was no significant difference in yield between canes developing from healthy or diseased setts. N : Co. 310, Co. 331 and Co. 310 were moderately resistant to infection. There is considerable recovery from mosaic in N : Co. 310 and Co. 301 in the first and second ratoon crops.

2286 KING, N. J. & STEINDL, D. R. L.

The relationship between varietal yield deterioration and ratoon stunting disease.

Cane Gr. quart. Bull. 1953 : 17 : 64-73.

The text of a paper presented at the Eighth Congress of the International Society of Sugar Cane Technologists is given. Since the previous congress in 1950, at which the authors contributed separate papers (cf. *PBA*, Vol. XXII, Abst. 1291) on varietal deterioration and ratoon stunting disease in Queensland, respectively, sufficient evidence has been obtained to warrant the conclusion that varietal deterioration is closely related to ratoon stunting, a disease believed to be caused by a virus.

2287 LEE [Li], T. T.

(Report on comparative trials of sugar cane varieties in 1951-52. I).

Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 147-54. [Chinese].

Data are provided on percentage germination, tillering, growth rate, yield of cane, yield and quality of the juice, arrowing, percentage of dead stalks and borer damage, for nine varieties under trial in Taiwan. The most promising was PT 46-256, which yielded 19.4 metric tons per ha.

2288 KWONG [KUANG], K. H., WU, W. Y. & CHANG, C. C.

(Report on comparative trials of sugar cane varieties in 1951-52. II).

Kanche Yenchiu/J. Sugar Cane Res. 1952 : 6 : 155-66. [Chinese].

Out of 23 varieties under trial in Taiwan, PT 46-93, 47-50, 47-72, 47-74, 47-241 and 47-612 and Co. 421 are singled out for their high sugar yields and desirable agronomic characteristics.

2289 **Twenty-third Annual Report of the Sugarcane Research Station, Department of Agriculture, Colony of Mauritius 1952 (1953) : Pp. 28.**

Work in developing varieties equal or superior to M 134/32 has continued. Barbados varieties 3337, 37172, 37161 and 34104 are of high grade and give good yields but further trials are considered necessary before adding them to the approved variety list. M 11/43, 129/43, 31/45,

24/47 and 147/44 have proved worthy of further trials. M 423/41 and Ebene 1/37 gave good yields but the first had low sucrose content and the second was erratic in growth.

2290 **Fodder canes.**

Aust. Sug. J. 1954 : 45 : p. 679.

The approved varieties which can be grown for fodder in the mill areas of Northern, Mackay and Southern districts of Queensland are given.

2291 Belgische rassenlijst. (**Belgian varietal list**).

Meded. Ned. Alg. Keuringsdienst Landbouwzaden Aardappelpootgoed 1954 : 10 : p. 86.

The sugar beets Hilleshög N, Hilleshög R, Klein Wanzleben Polybeta, Kuhn R-E and Zwaanesse III-E have been included in the Belgian list of approved varieties.

2292 DONÀ DALLE ROSE, A.

Caratteri correlati e miglioramento della barbabietola da zucchero. (**Correlated characters and breeding in sugar beet**).

Ital. agric. 1954 : 91 : 144-48.

Various correlations that have been reported are referred to: early leaf development in spring is correlated with early maturity but also with a tendency to bolt, high weight of leaves is often correlated with late maturity and high weight of roots with low sugar percentage, and high potassium content in roots and leaves has recently been shown to be correlated with high sugar percentage.

2293 KLOEN, D. & SPECKMANN, G. J.

The creation of tetraploid beets.

Euphytica, Wageningen 1953 : 2 : 187-96.

At Wageningen, germinating seeds of the sugar beet varieties Kuhn P and KWE, the mangel varieties Frisco, Alpha and Barres Strynø 10 and fodder sugar beet CB were treated with colchicine. Treatment with 0.1% solutions gave more tetraploids than 0.2% solutions. Examining leaves in the rosette stage proved an inefficient method of selecting for tetraploidy. As an alternative, the authors recommend that selection for tetraploidy should be made when the stalks are *ca.* 20 cm. long, only a single stalk in which tetraploidy has been confirmed being allowed to continue growing from each root.

2294 KLOEN, D. & SPECKMANN, G. J.

The creation of tetraploid beets. II. Selection in the first generation (the C₁) from the treated material.

Euphytica, Wageningen 1954 : 3 : 35-42.

Colchicine-induced tetraploids of sugar-beet and

mangel varieties were obtained at the Institute of Plant Breeding, Wageningen, Netherlands, during 1950-52 (cf. Abst. 2293). C_0 plants obtained in 1950 produced 52.6% tetraploids, 45.6% triploids and 1.9% diploids in the C_1 as shown by cytological sampling of the leaves of seedlings. The C_1 of the 1952 batch contained 77.3% tetraploids, 20.6% triploids and 2.1% diploids; in this lot only C_0 stalks in which no diploid cells had been found were used for seed production. In order to speed up the breeding programme, C_1 plants can be vernalized so that they produce seed within a year. C_1 plants were subjected to a further cytological checking before flowering. The unreliability of stoma and pollen measurements as criteria of tetraploidy in C_1 plants is stressed.

- 2295 COONS, G. H.
Some problems in growing sugar beets.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 509-24.

American varieties resistant to curly top, *Cercospora beticola*, *Aphanomyces cochlioides*, *Peronospora schachtii* and *Uromyces betae* are mentioned.

- 2296 ŠEMJAKIN, P. N.
(Breeding sugar beet for improved resistance to organisms causing clump diseases).

Sahar. Promyšl. (Sug. Industr.) 1953 : No. 4 : 39-42. [Russian].

At Ljgov, I 1305, L 1739, M6ZZ, M 2 and R 632 showed a high degree of resistance to *Botrytis* rot and other storage diseases. R 632, however, develops more hollow roots than the others and appears to be the least resistant to diseases. Selection for solid roots is advocated.

- 2297 HAVRÁNEK, A.
Využití srovnávacích pokusů s cukrovkovými semeny pro rayonisaci odrůd. (Comparative trials of sugar beet varieties as the basis for their standardization).

Sborn. čsl. Acad. Zeměd. 1954 : 27 : 37-52.

Standards for many districts of Czechoslovakia are recommended on the basis of varietal trials under varied climatic and soil conditions. Varieties with high average yields of sugar include Dobrovická A and Dobrovická V, noted for their high root yields, and Zapotil and Dobrovická C, interesting for their high sugar content.

STIMULANTS

- 2298 LAUMONT, P.
La Station Expérimentale Agricole d'Isserville. **(The Isserville Agricultural Experiment Station)** : Pp. 11.

A general account of breeding work with tobacco at the Isserville experiment station, Algeria, is given. At the present time emphasis is being placed upon producing varieties yielding a better quality tobacco. One of the most important achievements of the station has been the development of the variety Spaka, formerly Spada 11-15 (cf. PBA, Vol. XVIII, Abst. 385).

- 2299 HEGGESTAD, H. E. & NEAS, M.O.
Burley 2. A new, improved variety of tobacco.

Circ. Tenn. agric. Exp. Sta. 1953 : No. 110 : unpaginated.

Burley 2 was developed from a selection of Barnett's Special at the University of Tennessee Agricultural Experiment Station. It resembles Kentucky 16 and is superior or equal to it in yield with, on the average, one leaf per plant more. The leaves are broad, smooth and tend to be "cupped." It is intermediate between Burley 1 and Kentucky 16 in stalk diameter and height; is adapted to a variety of soil conditions and is moderately resistant to black root rot. Results of comparative trials between Burley 1 and 2 and Kentucky 16 for yield at seven locations are given.

- 2300 BENINCASA, M.
Tabacchi americani da sigarette.
(American cigarette tobaccos).

Tabacco, Roma 1953 : 57 : 408-13.

In reminiscences on his long years of experiments on acclimatizing the varieties Maryland, Burley and Virginia Bright in Italy, the author mentions that he selected for low nicotine content. The present Italian selections, such as Bright Italia, are producing tobacco of excellent quality which is in demand even in the international market.

- 2301 L'amélioration de la culture du tabac en Autriche. **(Improving tobacco cultivation in Austria).**

Rev. Tabacs 1953 : 28 : No. 204 : 39-41.

An account of the work of the Tobacco Breeding Station, Fürstenfeld, is given. Among new high-yielding and disease-resistant varieties developed are Speranza, Monarque [Monarch], New Burley, Burley-Bolsunov, Burley-Titan and Burley-Fürstenfeld. Strains of Debresiner with improved quality, increased yield and

greater resistance to disease have been bred. In experiments to determine which foreign varieties are best suited to Austrian conditions, several Italian and Hungarian types have been tested. The results of chemical analyses of the main varieties grown in Austria are appended.

- 2302 ALCARAZ MIRA, E.
Genética del tabaco. (**Genetics of tobacco**).
Euclides, Madr. 1953 : 13 : 344-48; 392-97; 438-43; 1954 : 14 : 13-20.

The review referred to in *PBA*, Vol. XXIII, Abst. 2875 is continued and completed, attention being mainly directed to the cytological aspects and the production of polyploid hybrids.

- 2303 ROLLIN, L. & LAUMONT, P.
Orientation à donner à la culture du tabac en Kabylie. (**Guide to the cultivation of tobacco in Kabylie**).
Tabacoop Kabyle, Alger 1953 : Pp. 15.

A general guide to the cultivation of tobacco in the Kabylie area of Algeria is given, and recommendations are made as to choice of varieties. Spaka (cf. Abst. 2298), a vigorous local variety, is superior to all varieties introduced from abroad. Local varieties are being crossed with foreign strains to obtain higher quality tobaccos.

- 2304 MANN, T. J., WEYBREW, J. A. & MONROE, R. J.
Will we be growing tobacco ten feet tall?

Research and farming. Progr. Rep. NC agric. Exp. Sta. 1952 : 11 : No. 2 : 11-12.
Both Virginia Gold and 8341 used as parents raised the yield of hybrids produced at the North Carolina Experiment Station over that of the parent varieties. Hybrids between *Nicotiana tabacum* and *N. sylvestris* flower earlier than the parents but when the "mammoth" character is present flowering only occurs under short days. Alkaloids in the hybrid consist of 92% nicotine.

- 2305 KEHR, A. E.
Cycles of transformation of tissues of certain genetically controlled, tumor forming *Nicotiana* hybrids.
Genetics 1953 : 38 : p. 672. (Abst.).

Transformations of tissue of the hybrid *N. glauca* x *N. langsdorffii* occurring *in vitro* are briefly described. A slow-growing culture isolated from nontumour tissue may give rise to rapidly growing tumour cultures. The latter may differentiate into organized tissues or, under certain conditions, revert to slow-growing

callus tissue. Tumour tissue may lose its ability to differentiate, and also to be returned to *in vivo* growth and be implanted in *N. glauca*.

- 2306 TAKENAKA, Y.
(**Cytogenetical studies in *Nicotiana*. I.**).

Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 384-92. [Japanese].

The following haploid chromosome counts are reported: *N. plumbaginifolia*, $n = 10$; *N. repanda*, 24; and *N. glauca*, *N. sylvestris* and *N. glutinosa*, 12. Meiosis was regular in all these species except *N. glutinosa*, where there was evidence of some secondary association. Colchicine-induced autotetraploids of the tobacco variety Odaruma reverted to the diploid condition after propagation for seven years; tetraploids of Nambu showed a range of chromosome numbers from diploid upwards. An amphidiploid of *N. plumbaginifolia* x *N. alata* had the expected 19 bivalents, with some irregularity in the segregation of the chromosomes to the poles at anaphase.

- 2307 MALLAH, G. S. [AL MALLAH, J.]
Inheritance in *Nicotiana Tabacum* XXV. Analysis of an interchange.

Proc. Egypt. Acad. Sci. 1952 : 8 : 12-25.
Cytological studies were carried out on a single interchange heterozygote derived from a cross between vars. *cuba* and *purpurea*, and characterized by a ring of four chromosomes attributed to reciprocal interchange between two non-homologous chromosomes. The fertility of the interchange heterozygote was apparently due to the distribution of alternate chromosomes of the ring to the same pole at metaphase I in most cases. Crosses of the interchange heterozygote with the cytologically normal var. *purpurea* gave rise to three of the four chain-of-four types expected from nondisjunctional distribution. The following types of monosomic derivatives are described: haplo-L, haplo-J, the double monosomic for chromosomes J and L, and a "tertiary monosomic" with 22 bivalents and a trivalent chain consisting of two normal J and L chromosomes and an interchanged J-L chromosome. Plants derived from the cross between the double monosomic and the interchange heterozygote included a number of "monosomic interchange heterozygotes," exhibiting 22 bivalents and a trivalent chain composed of 1 normal and 2 interchanged chromosomes; evidence was thus obtained that the chromosomes of var. *purpurea* involved in the ring were J and L.

- 2308 MURAOKA, Y., TOKITSU, T. & OHORI, K.
(Varietal differences in the way in which the growth processes of tobacco respond to various combinations of temperature and day length).
Ikushugaku Zasshi/Japan. J. Breeding
1953 : 2 : 133-41. [Japanese].

Differences in the mode of development of the four varieties Nambu [Southern], Slate's Golden Dollar, Bright Yellow and TI 448 A under (a) low temperature and short photoperiods, (b) low temperature and long photoperiods, (c) high temperature and short photoperiods, and (d) high temperature and long photoperiods are described.

- 2309 MIHAĬLOVA, P. V.
(Selective fertilization in tobacco and modes of mutual interaction between the pollen and the pistil tissues).
Bjull. mosk. Obšč. Ispyt. Prirod. (Bull. Moscow Soc. Nat.) 1951 : 56 : No. 5 : 70-78. [Russian].

Fertilization processes in *Nicotiana tabacum*, involving material pollinated with mixed pollen of two other varieties or self pollen + pollen of another variety, have been investigated. Evidence suggests that the degree of compatibility between the female parent and pollinator is determined by the mode of mutual interaction between (1) the pollen tubes and tissues of the pistil and (2) the pollen from different sources. The view that selective fertilization is founded on competition between pollen tubes and that the general capacity for growth of pollen tubes is a varietal characteristic is rejected.

- 2310 CLAYTON, E. E.
Developments in growing tobacco.
Plant Diseases. Yearb. Agric. US Dep.
Agric. 1953 : 540-48.

Oxford 1, Vesta 47 and Dixie Bright 101 are moderately resistant to black shank; Oxford 26, Dixie Bright 27, 101, 102 and Golden Wilt to bacterial (Granville) wilt and 142, 211, 307, K1 and K2 (Havana), Kentucky 16, 41A and Burley 1 and 2 (burley), to black root rot.

- 2311 CLAYTON, E. E.
The genes that mean better tobacco.
Plant Diseases. Yearb. Agric. US Dep.
Agric. 1953 : 548-53.

An account of breeding for resistance to the common diseases is given. Resistance found within the cultivated tobacco types is compared with that which can be obtained from related *Nicotiana* species.

- 2312 D'AMATO, F.
Aspetti istologici della infestazione di radici di *Nicotiana glauca* x *N. Langsdorffii* da parte di *Heterodera marioni*.
(Histological aspects of the root infestation of *N. glauca* x *N. Langsdorffii* by *H. marioni*).
Agricoltura ital. 1952 : 7 : 212-15.

A series of photomicrographs of galls developed on the amphidiploid hybrid *N. glauca* x *N. langsdorffii* (2n = 42) is presented.

- 2313 JENKINS, W. A., SHARP, D. G. & WOLF, F. A.
A strain of tobacco mosaic virus inducing systemic necrosis in flue-cured tobacco.
J. Elisha Mitchell sci. Soc. 1953 : 69 : 161-69.

A strain of tobacco mosaic virus causing prematurity and systemic necrosis attacked the tobacco Virginia Gold in a field near Chatham, Va., during 1951 and 1952. Inoculation experiments showed that the strain was capable of damaging other varieties, although less severely. Varieties carrying the *glutinosa* factor for resistance to tobacco mosaic virus offer a means of controlling infection due to this strain, which is possibly identical with the Rotterdam-B disease occurring in Sumatra.

- 2314 Report of progress 1951-1953.
Bull. Tob. Res. Bd. Sth. Rhod. 1953 : No. 3 : Pp. 48.

Hicks and Delcrest gave the greatest yields of high-grade leaf. A mosaic-immune variety Vamarr 50 is now available.

- 2315 AGAPOVA, I. V.
(The influence of grafting in changing the virus resistance in some Solanaceae).
Trud. Inst. Genet. (Proc. Inst. Genet.)
1953 : No. 20 : 293-311. [Russian].

When inoculated with the tobacco mosaic virus, F_1 plants of *Nicotiana tabacum* grafted on *N. glutinosa* or on the hybrid *N. glutinosa* x *N. tabacum* developed either local or systemic necroses. All the material irrespective of its behaviour in the F_1 gave segregates in respect of the type of necrosis in the F_2 . In some cases grafted material with a recessive character produced progeny with a dominant character. *N. tabacum* plants grafted three times in succession on *N. glutinosa* developed only local necroses when their leaves were inoculated with the virus. No changes were observed in tomato grafted once, twice or three times on *N. glutinosa*,

Datura tatula or *Cyphomandra* or in the early seed generations of the resultant vegetative hybrids.

2316 Flue-cured varieties.

Inter. Rep. Tob. Res. Bd. Sth. Rhod. 1952 : No. 1 : unpaginated.

Data on the grade index and yield of ten tobacco varieties from experiments carried out at three research stations are given. Results of preliminary tests of 25 varieties are included.

2317 BOLSUNOV, I.

Ergebnisse der Köpf- und Entgeizversuche mit einigen in Österreich gebauten Tabaksorten. (**Results of experiments on topping and removal of laterals in some varieties of tobacco grown in Austria**).

Fachl. Mitt. öst. Tabakregie 1953 : No. 3 : 17-23.

Varietal differences in reaction to the removal of inflorescences and lateral shoots were noted. The yield of Burley types was not increased by this practice, but that of varieties with a high content of alkaloid rose by 7-12%, and that of the imported Hungarian variety Sabolz by 20%. Diploids reacted more strongly than tetraploids.

2318 SIMURA, T. & INABA, T.

(**Studies on polyploidy in tea bushes**).

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 205-13. [Japanese].

Triploid Japanese varieties have thicker leaves, and larger and fewer stomata, are more resistant to cold, and transpire less in September than diploid forms. Fertility in the triploids is low but varies with the variety. An aneuploid with $2n + 44$ chromosomes was noticed among the triploid progenies.

Some tetraploid plants have been obtained by treating diploid seedlings with colchicine.

2319 Mesa Redonda del Café. (Coffee Round Table).

Suelo tico 1953 : 7 : No. 29 : Pp. 171.

A round-table discussion on common problems concerning the various coffee-growing countries of South America was held at San José, Costa Rica, on 21-26 September, 1953 and the proceedings are here presented. One of the main problems under discussion was the control of *Hemileia vastatrix* should it appear on the American continent. Several delegates spoke in favour of international cooperation in dealing with this and other problems and the delegation for El Salvador proposed the establishment of an international Institute of Coffee Investigations, suggesting El Salvador as a suitable site for it.

The genetical aspect was dealt with in the following contributions.

Krug, C. A. *Aspectos teóricos y prácticos de un programa de mejoramiento del caféto. (Theoretical and practical aspects of a programme of coffee breeding).* (pp. 40-47).

It is pointed out that the material of the genus *Coffea* existing in the main botanic gardens of the world is insufficient to form the basis of a satisfactory cytogenetic study of the genus and that further collections of wild material from Africa are urgently needed. A good collection of varieties of *C. arabica* is, however, available at the Campinas institute in Brazil. All differ in some respects from the type specimen, to which var. *typica* conforms most closely. Many variants are the result of recombination of a small number of genes or chromosome changes and should not be given taxonomic rank (cf. Abst. 1340). Certain monosomics have recently been found which are identified with previously known gene mutants, e.g. var. *angustifolia*. Fertile hexaploid interspecific hybrids have been obtained by colchicine treatment and some interesting results are being obtained in studying the behaviour of the same gene when transferred to different species. Reference is made to the work of mother-plant selection carried out in Bourbon coffee (cf. Abst. 1335).

León, J. *Importancia de estudios sistémáticos y ecológicos en los cafés silvestres de Africa. (Importance of systematic and ecological studies of the wild coffees of Africa).* (p. 101).

The importance of collecting as much material as possible of *C. arabica* from Abyssinia, Kenya and adjacent areas is emphasized and it is requested that FAO should take steps in this direction, in collaboration with other appropriate bodies.

2320 CASTRO, M. F.

El mejoramiento del caféto en Colombia. (**Breeding coffee in Colombia**)

Bol. Inform. Cent. nac. Invest. Café 1953 : 4 : No. 46 : 11-30.

At a meeting in October 1953 the outline of a breeding programme with *Coffea arabica* var. *typica* drawn up by G. V. Potter was presented, followed by some comments of H. Hopp, who maintained that the degree of improvement attainable by individual plant selection in coffee still remains to be determined. At present some 109 progenies, 89 of which are already in bearing, are under observation; the

results of two years' data show that of those trees that were the best of a group of 10 in the first year only 1 in 40 continued in the first place in the second year. In consultations with experts from other countries in S. America, C. A. Krug referred to the results of individual plant and progeny selection with *C. arabica* in Brazil, which show that yield data over a period of 14 consecutive years give the best basis for selection of the best trees, although fairly reliable indications are given by the data for the 13th and 14th years alone (cf. Abst. 1335); the best mother trees often, but not always, gave the best progenies and the need for replications in assessing the value of progenies was stressed.

In conclusion it is recommended that (1) observations be made on other varieties such as *C. arabica* var. *bourbon*, which in Brazil is proving superior to var. *typica* in yield and not inferior in quality; (2) experiments on improving var. *typica* by selection should continue, since there is no evidence to suggest that this will not have positive results; (3) the method employed for this purpose be that adopted for var. *bourbon* in Brazil (*loc. cit.*); and crossing experiments be left till later, when a more secure taxonomic, genetic and cytological basis for them has been established.

2321 The fifth Annual Report of the Research Department of the Indian Coffee Board (1951-52).

Bull. No. 5 : Pp. 80.

Breeding of Arabica and Robusta coffee for vigour, yield and disease resistance is reported. It comprises preliminary selection, hybridization and selfing of selected plants and comparative trials of clones. Beans of the Arabica BA series were measured and classified as roundish, roundish oblong and longish types. Those of the Robusta BR series were roundish oblong or longish. Selections from the same plant family did not always fall into the same group.

2322 THOMAS, K. M.

Coffee breeding—a retrospect.

Mon. Bull. Indian Coffee Bd 1954 : 18 : 17-19.

Emphasis is laid upon the importance of the large collection of selections and hybrids at the Coffee Experimental Station, Balehonnur, Mysore. The work of screening these cultures was initiated in 1950. Promising selections of *Coffea arabica* are still fairly heterozygous; the problem of their propagation vegetatively and by seed during the period required to develop homozygous parents is discussed.

2323 NARAYANAN, B. T.

Balehonnur coffee selections. Their origin, spread and distribution.

Mon. Bull. Indian Coffee Bd 1954 : 18 : 15-17.

A short historical account of breeding at the Coffee Experimental Station, Balehonnur, Mysore, is given. The selections, obtained from progenies of three mother plants, S 26, S 31 and S 44, isolated in 1938, were distributed about a decade ago; the majority are both high yielding and resistant to *Hemileia vastatrix*, but they are still impure, producing 5-15% of off-types.

2324 FERWERDA, F. P.

A tentative breeding method for Robusta and other allogamous coffee species.

Euphytica, Wageningen 1954 : 3 : 12-19.

In Indonesia the standard method of improving *Coffea robusta* requires at least 25 years; it consists of hybridization involving pairs of selected parents or their clones, experimental and semicommercial tests of the F_1 hybrids and large-scale planting of the most promising combinations. The author proposes a less time-consuming procedure. Trees chosen after a brief period of observation are top-crossed to determine which have the best general combining ability. Such trees are crossed in all possible directions and the progenies tested. Large-scale seed production of the best combinations is accomplished in biclonal or polyclonal gardens. These gardens are established when the tests of the F_1 hybrids are initiated; as soon as the best combinations have been identified, rejected clones are cut down and regrafted with scions of the selections. It is thought that, after 12 years' work, the immediate distribution of the polyclonal seed from the gardens, while the F_1 hybrids are still under trial, would be justified. Eighteen years are necessary for completion of the scheme.

2325 FERWERDA, F. P.

La evolución del café en Java: 1932-1942. (The evolution of coffee in Java: 1932-42).

Hacienda, NY 1948 : No. 3 : 38-41; No. 4 : 38-41.

An historical outline in Spanish is given of the development of research on coffee growing and breeding at the experimental stations of Malang, Besoeki and Bangelan in Java. An account is given of the methods of selecting mother trees, emasculation and hybridization in Robusta coffee. Large amounts of seed of

the desired combinations were produced by growing monoclonal plantations by grafting and then pollinating artificially. The families obtained after over 30 years of selection exceeded the initial material by 50–100% in yield and could be recreated at any time from the original clonal material. At the Besoeiki station attention was given also to quality and improvements were effected in size of seed without loss of yielding ability. Hybrids of Robusta coffee with *Coffea arabica* have proved somewhat better than Robusta in quality.

Monoclonal plantations of *C. liberica* x *C. arabica* were self fertile like *C. arabica*, those of all other species were self sterile and required pollinators; the best clones gave, when so planted, yields equal to those of the best families while being superior in uniformity. Studies of pollination and fertilization have shown the various reasons for low set, fruit drop and defective seeds.

- 2326 O café Sumatra de Mundo Novo. (**The coffee Sumatra from Mundo Novo**).
Bol. Suptda Serv. Café, S. Paulo 1953 : 28 : No. 319 : 55–56.

The Mundo Novo [New World] coffee, thought to be a hybrid between *Coffea arabica* var. *typica* and var. *bourbon* (cf. Abst. 1334), contains a certain number of plants which bear seeds with empty locules. Directions are given for overcoming this defect by selection of suitable trees.

- 2327 Características de um novo cafeeiro. (**Characteristics of a new coffee**).
Bol. Suptda Serv. Café, S. Paulo 1953 : 28 : No. 319 : 57–58.

Reference is made to Campinas 387, originally thought to be a form of *Coffea dewevrei* var. *excelsa*, which has given exceptionally high yields under the most unfavourable conditions of climate and soil. Some of its progeny have yielded an average of 30 kg. of ripe fruits per year, and the best has given up to 58 kg. It contains a rather large proportion of mono-spermic fruits and is distinctly low in quality; it is now considered to be an interspecific hybrid.

- 2328 **Eighteenth Annual Report of the Coffee Research and Experimental Station, Lyamungu, Moshi, Tanganyika 1951 (1954) : Pp. 39.**

In three experiments comparing the yields of clones and seedlings of the same parent plants there was a significant difference in only one case and this was in favour of the seedling progeny.

- 2329 VAN DER KNAAP, W. P.
Overzicht van de selectiewerkzaamheden ten behoeve van de cacao-cultuur. (**Survey of selection work for the benefit of cacao cultivation**).
Arch. Koffiecult. Ned.-Ind. 1953 : 17 : 141–63.

A general account of clonal selection and hybridization is given and the statistical design of clonal and seedling trials discussed. At the Kedungpani Experiment Station in Central Java, attempts are being made to breed pure lines with a view to crossing these at a later stage to exploit heterosis.

- 2330 VAN DER KNAAP, W. P.
Algemene beschouwingen over de factoren, welke van invloed zijn op de productiecapaciteit van cacao-clonen. (**General considerations on the factors that influence the productive capacity of cacao clones**).
Arch. Koffiecult. Ned.-Ind. 1953 : 17 : 121–40.

The comparative influence of variety and environment are discussed. Positive correlations have been established between trunk circumference, measured 40 cms. from ground level, and pod production and between weight of the pod and weight of individual beans.

- 2331 COPE, F. W.
Some notes on the I.C.S. clones.
J. agric. Soc. Trin. Tobago 1953 : 53 : 245–54; 318–25.

Imperial College selections of cacao were propagated at River Estate by buddings on to unselected seedling rootstocks and by cuttings. The yields and rates of development were compared. Clones ICS 1, 6, 8, 39, 40, 43, 49, 60, 84, 95, 98 and SCA 6 and 12, seven of which were self incompatible, yielded best. In the early years some clones yielded better as cuttings than buddings but from the 10th year yields were similar. Others yielded better at first as buddings. Slow development of the root system of the cuttings may be responsible. Clones SCA 6 and 12 are highly resistant or immune to witches' broom. It was advised that self-compatible and self-incompatible clones be planted together to ensure adequate pollination.

- 2332 Blauwmaanzaad, 1954. (**Opium poppy, 1954**).
Landbouwvoorlichting 11 : Bijl. 7; Ber. Rassenkeuze No. 159 : 1954 : unpaginated.

Data on yield, quality of seed and morphological

characteristics of four varieties cultivated in the Netherlands are presented. In variety trials, Noordster [North Star] and Eckendorfer gave the highest yields.

2333 Institute of Brewing hop trials : Wye variety 1951 crop.

J. Inst. Brew. 1954 : 60 : 5-11.

Varieties Sunshine, Early Choice, Keyworth's Early and Keyworth's Midseason were used in experimental brewing by 11 breweries before and after nonrefrigerated storage. Little deterioration during storage was observed though α -resin content decreased. In copper hopping, Early Choice was considered best though all could be used in suitable proportions. None of these varieties was favoured for dry hopping.

MINOR CROP PLANTS

2334 MAKINO, I.

(The number of chromosomes in lavender).

Senshokutai (Chromosome)/Kromosomo 1951 : No. 8 : 318-19. [Japanese].

Lavandula vera vars. *delphinensis* and *fragrans* each have $2n = 50$ chromosomes.

2335 New pepper released by South Carolina.

Seed World 1954 : 74 : No. 3 : p. 47.

A deciduous cayenne pepper variety, Carolina Hot, has been released by the South Carolina station. In developing the variety, selection was made for disease and nematode resistance. The pods are uniform and deep red. The yield is said to be higher than that of any other type.

2336 DOOLITTLE, S. P.

Diseases of peppers.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 466-69.

The red pepper varieties Rutgers World Beater 13, Burlington and Yolo Wonder are resistant to tobacco mosaic.

2337 NISSLEY, C. H.

New Jersey vegetables.

Hort. News, NJ 1954 : 35 : 2728, 2732.

In red pepper strain tests, Yolo Wonder, Rutgers World Beater 13, Burlington, Paul's Jersey Giant and 5212 gave high yields and were free from mosaic.

2338 ANDERSSON, G. & OLSSON, G.

Försök med sareptasenap och svartsenap som oljeväxter. (Experiments with *Brassica juncea* and black mustard as oil plants).

Sverig. Utsädesfören. Tidskr. 1953 : 63 : 397-415.

This report on a comparative study, carried out

in Sweden, of *Brassica juncea* and *B. nigra* contains a description of the two species, with observations on their geographical origin and on research in various countries on types of *B. juncea*.

In the Swedish experiments recorded, both *B. juncea* and black mustard gave higher seed yields than spring rape, but the low oil content and the high allyl mustard oil content of black mustard and its tendency to shedding reduce its value as an oil crop considerably. Thus, though less susceptible to certain pests than spring rape, it cannot be grown for oil in Sweden. The same holds, for the present, for *B. juncea*; in spite of its earliness, its good seed yield, fairly high oil content, strong stems and comparative resistance to pod gall midge, its content of allyl mustard and the iodine value of the oil are too high and it is also susceptible to club root and possibly also to beet eelworm. Nevertheless, the varieties, obtained from various countries of Europe and from Stalingrad for testing at Svalöf, exhibit a sufficient range of variation in important economic characteristics to justify further breeding and research on interspecific hybridization.

2339 ANDERSSON, G.

Våroljeväxter av Svalöfsstammar.

(Svalöf strains of spring oil crops).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 20-23.

In reviewing the performance of various oil crops bred at Svalöf, mention is made of the spring rapes Svalöf Regina and Regina II, the spring turnip rape Svalöfs Gute, the white mustard Svalöfs Primex, and the linseeds Svalöfs Valuta and Svalöfs Renodlade oljelin II [Svalöf Pure-bred linseed II], all of which have been already noted in *Plant Breeding Abstracts*.

A strain of Camelina, Sv 0700, has surpassed Vaanila in yield of seed by 4%.

2340 OLSSON, G.

Undersökning av självfertiliteten hos artificiell rap. (Investigation of self fertility in artificial rape).

K. LantbrAkad. 1953 : 92 : 394-402.

Since both *Brassica campestris* ($2n = 20$) and *B. oleracea* ($2n = 18$), from which *B. napus* ($2n = 38$) can be synthesized by hybridization, have low chromosome numbers and are usually more or less sterile, while natural rape with its high chromosome number is highly self fertile, a study of the degree of self fertility in artificial rape was undertaken in order to elucidate, if possible, the cause of self fertility in natural

rape. Pollen tube penetration in the style on selfing and the set of seed on selfing and crossing within the parent species (in both the diploid and tetraploid condition) and in artificial rape plants were used as criteria of self fertility. Results showed that the turnip rape (*B. campestris*) used, though markedly self sterile, produced a few seeds on selfing, while in the cabbage both sterile and relatively self-fertile individuals were found.

In general, earlier findings based on the practical experience of breeders were borne out by the existence of differences in self fertility within turnip rape, cabbage and natural rape and also in the artificial rape plants. Only a very small number of the latter proved self fertile.

In the author's opinion, neither autopolyploidy in the parent species nor allopolyploidy in rape appears *per se* to induce any marked increase in self fertility, which in natural rape is probably due to certain gene combinations brought together in the formation of the new species. Selection in nature would favour self-fertile types.

2341 Hybrids boost castorbean yields to be ready for growers next spring.

Seed World 1953 : 73 : No. 9 : 8, 47.

The hybrids produced by crossing the male-sterile line N 145-4 with numerous inbred lines gave higher yields than the parents.

2342 KURITA, N.

(Secondary pairing of chromosomes in the castor-oil plant).

Senshokutai (Chromosome)/Kromosomo 1949 : Nos. 5-6 : 225-26. [Japanese].

Descriptions and figures of secondary association between bivalents during meiotic metaphase and anaphase are given.

2343 LITZENBERGER, S. C.

Nicaraguan criollo castorbeans.

Agron. J. 1954 : 46 : 98-99.

Collections of native castor beans in Nicaragua are being studied cooperatively in plantings in the country of their origin and in the United States. In the Nicaraguan test, at La Calera, near Managua, the collections have all shown superiority in vigour and resistance to bacterial leaf spot, compared with introductions from the United States; they should therefore be useful in breeding.

2344 CALVERT, O. H., THOMAS, C. A. & VAN HORN, D. L.

A bacterial leaf spot disease of castorbean new for the United States.

Plant Dis. Repr. 1953 : 37 : 477-78.

Varietal differences in susceptibility to a leaf

spot disease, ascribed to a causal organism tentatively identified as *Xanthomonas ricinicola*, are noted. Cimarron appeared to be the most resistant variety in tests in Maryland and Texas; Anjou, Baker 195, Illinois 48-36 and Western Oil Hybrid also showed some resistance.

2345 COLLISTER, E. H.

There's profit in sesame.

Sth. Seedsman 1954 : 17 : No. 1 : 19-21, 72.

Renner Sesame 1, released by the Texas Research Foundation, is an improved strain of semishattering sesame which is capable of producing higher yields than the standard variety. Various problems connected with harvesting nonshattering strains have still to be solved.

2346 KINMAN, M. L. & MARTIN, J. A.

Present status of sesame breeding in the United States.

Agron. J. 1954 : 46 : 24-27.

An account of sesame as a world crop and the problems involved in adapting it to USA agriculture is given together with a summary of the present knowledge of its genetics. The methods used and progress made in breeding indehiscent types with desirable economic characters are described.

2347 "Pergamino Pampa M.A.G." Nueva variedad de lino oleaginoso. (Pergamino Pampa MAG, a new variety of linseed).

Idia 1953 : No. 69 : 19-20.

The variety is a selection from Lineta Catalana and has been inscribed in the Argentine Official Seed Register. It has outyielded the best of the standard varieties, has larger seeds, and in oil content and iodine number is surpassed only by Charrúa MAG. It possesses satisfactory resistance to rust, pasmo and wilt, in which respect it is superior to Querandí MA, which it is designed to replace, though inferior to Charrúa MAG in wilt and rust resistance.

2348 FRÖIER, K.

Oljelin—en alltjämt aktuell odling. (Linseed, a crop becoming more and more of importance).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 23-24.

Further information is given (cf. Abst. 1369) on the performance of Svalöfs renodlade oljelin II [Svalöf Pure-bred linseed II] and Valuta, bred by the Swedish Seed Association.

On the average for all linseed growing districts, Valuta is the highest yielding and superior in cultivation value; it is also well adapted to the

Swedish climate, as shown by its average crude oil content of 44.5% in 20 trials at the Svalöf, Kalmar, Östgöta, Ultuna and Västgöta stations in 1946-51. In ten trials during 1948-51, it also surpassed Adoptiv and the Finnish linseed Vaanila in crude oil content by 0.4% and 1.9% respectively. By further hybridization it is hoped to increase its oil content and yield of seed, while retaining its other valuable characteristics.

- 2349 BERDYŠEV, A. P. & LEBEDEVA, N. P.
(A method for determining the oil content of separate seeds in a sunflower inflorescence).
Zemledelie (Agriculture) 1954 : No. 1 : 89-92. [Russian].

A simplified method, based on the determination of the specific gravity of the kernels in salt solutions, is recommended for selection of the seeds with the highest oil content within a seed head.

- 2350 SMITH, J. M.
New varieties insure a place for safflower among oil crops.
What's New Crops Soils 1954 : 6 : No. 4 : p. 15.

Safflower cultivation in the western USA is described. A rust-resistant variety, Western Oilseeds 14, is to be released in 1954. N-10, a single plant selection from N-852, has a higher yield and higher oil content than its parent.

- 2351 RIEDL, W. A. *ET AL.*
Safflower variety adaptation trials in Wyoming, 1952.
Mimeogr. Circ. Wyo. agric. Exp. Sta. 1953 : No. 31 : Pp. 2.

The results of trials of six varieties at four locations for grain yield, oil obtained, height of plants and date of flowering are given. N-8 and N-6 yielded significantly more than the other varieties at all stations. N-6 yielded most on irrigated land and N-8 on dry land.

- 2352 PRONK, F.
Vergelijkend tros-analystisch onderzoek van enkele typen van de oliepalm (*Elaeis guineensis* Jacq.). [Comparative analytical investigation of several types of oil palm (*E. guineensis* Jacq.)].
Bergcultures 1953 : 22 : 527-33; 573-81.

The yield and composition of fruit of five types of *E. guineensis* were compared at the A.V.R.O.S experimental station in eastern Sumatra in an attempt to establish the quantitative character-

istics distinguishing these types. Correlations were found between fruit weight and bunch weight, and between oil content and pericarp proportion. Parthenocarpic fruits were frequent in Import *dura* and Import *tenera* individuals. In crosses between *dura* and *pisifera*, the *dura* parent should be selected for small kernel and high pericarp percentage, shell thickness being of minor importance.

- 2353 PRONK, F.
Recherche sur quelques types de palmiers à huile par l'analyse comparée de leurs régimes (*Elaeis guineensis* Jacq.). [Research on several types of oil palms by a comparative analysis of their performance (*E. guineensis* Jacq.)].
Oléagineux 1954 : 9 : 65-73.

This is a translation into French of the article summarized in Abst. 2352.

- 2354 KATAYAMA, T.
Cytogenetical studies on the sterile wild senna (*Cassia Tora* L.) produced by the atomic bomb explosion. IV. On the gigas mutants segregated from the asynaptic wild senna (*Cassia Tora* L.).
J. Fac. Agric. Kyushu Univ. 1953 : 10 : 119-32.

Two gigas mutants, 21-8 and 65-1, offspring of an asynaptic wild senna which differed from the normal type only in higher sterility, were studied morphologically and cytologically. The gigas mutants had a later flowering date, higher sterility, larger leaves and rachis, greater height and stem width and branched more frequently than the normal plants. They were trisomics with 27 chromosomes and showed various aberrations at meiosis. The most frequent configurations seen were $1_{III} + 12_{II}$ and $13_{II} + 1_I$, though $1_{IV} + 1_{III} + 10_{II}$ occurred occasionally. Monads, hexads and tetrads abnormal in shape or size were seen after meiosis. Of the 12 seeds obtained from 21-8, only two germinated. One of these had nuclei containing 27 chromosomes and the other 26. In the former, chromosome behaviour at meiosis resembled the parent, and in the latter, normal plants.

- 2355 IKRAM ILAHI CHAUDHRI
Cultivation of medicinal plants in Pakistan.
Pakist. J. Sci. 1953 : 5 : 110-16.

A list of medicinal plants cultivated in Pakistan is given. Experiments to develop polyploids are being conducted with *Atropa belladonna* and *Ammi visnaga* at Abbottabad.

2356 BAZAVLUK, V. JU.

(The effect of pollination with a restricted amount and with an excess of pollen upon seed formation and development of the progeny in *Mirabilis jalapa*).

Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 94-99. [Russian].

Pollination with a large amount of pollen improved seed set and seed viability in *M. jalapa*, and resulted in increased vigour in the F_1 .

2357 OLÁH, L. V.

Genomutaciones en las plantas medicinales, *Datura stramonium* L., *Digitalis lanata* Ehrh. x *D. lutea* L. = *Digitalis santacatalinensis* n. sp. art. (Genome mutations in the medicinal plants *Datura stramonium* L., and *Digitalis lanata* Ehrh. x *Digitalis lutea* L. = *Digitalis santacatalinensis* n. sp. art.). Lilloa 1952 : 25 : 629-46.

Descriptions are given of tetraploid and hexaploid strains of *Datura stramonium* resulting from colchicine treatment. The tetraploids had a significantly greater content of alkaloids than the diploids. A colchicine-induced amphidiploid has been raised from the two *Digitalis* species cited above.

2358 TYSDAL, H. M. & RANDS, R. D.

Natural rubber . . . U.S. farmers can grow it.

What's New Crops Soils 1953 : 6 : No. 3 : 16-17.

The U.S. Department of Agriculture is crossing guayule with related species to obtain larger rubber-producing shrubs. The hybrids give more rubber per acre and retain their hybrid vigour through following generations. Attempts are being made to increase resistance to disease of *Hevea* in Latin America and increase the rubber yield of kok saghyz.

FRUITS AND NUTS

2359 MORETTINI, A.

Primo elenco delle razze delle principali specie di fruttiferi coltivate nell'azienda sperimentale. (First list of the varieties of the main species of fruit trees cultivated in the experimental farm). Riv. Ortoflorofruttic. ital. 1953 : 37 : 178-84.

A list is given of the varieties of pear, apple, quince, peach, plum, cherry, kaki, vine, fig and certain other fruits and nuts comprising the type collection of the University of Florence

in Italy. A number of Morettini's pear and peach hybrids are included in the collection.

2360 AVANZI, E.

Scelta e miglioramento delle piante ortofrutticole ai fini della esportazione. (Choice and improvement of horticultural plants for purposes of export).

Ann. Fac. Agr. Pisa 1952 : 13 : 45-62.

In reviewing the general situation of horticulture in Italy, the important role played by the new varieties produced by plant breeders is emphasized, special mention being made of peaches produced by Morettini and Guzzini, apples by Breviglieri and a potato variety by the author.

2361 GRANHALL, I.

Berättelse över verksamheten vid Balsgård år 1952. (Report on work at Balsgård, 1952) : Pp. 19.

Apple. Most of the crosses made were between diploids, the aims being (a) new, hardy and late-ripening varieties with relatively good resistance to scab; (b) extremely early varieties; (c) the production of desirable hybrid combinations; (d) the improvement of characters by back-crossing; and (e) high quality varieties from various crosses. The few diploid x tetraploid crosses made included a combination of the best-flavoured Balsgård tetraploid, M 2812 (a derivative of Ribston), with the hardy Antonovka Kamenička and also with the winter varieties Grön Yorkshire [Green Yorkshire], Vit Vinterkalvill [White Winter Calville] and Jonathan.

The best Swedish tetraploids were pollinated with pollen of tetraploid McIntosh obtained, as in the previous year, from the USA.

Self-fertility studies on 36 Balsgård tetraploids were also carried out.

Stocks undergoing selection included some derived from crosses. Selection was based partly on artificial freezing tests and also on measurements of wood and bark in the roots in order to discover any possible correlation between percentage of cortex and vigour of stock.

Pear. Numerous crosses were made with the following aims: the production of (a) late varieties with good storage properties; (b) better early types; (c) new red-fruited varieties; (d) greater winter hardiness, from combinations of Lybecker Bergamott [Lübeck Bergamotte] with Esperens Herre and Conference; and (e) new triploids from tetraploid Fertility x Conference.

Observations on older plantings suggest that it may not be impossible to breed varieties of outstanding flavour even in cold summers, but to combine the superior flavour with good size of fruit seems a more difficult problem.

Plum. Hybridization to obtain (1) new, hardy, early varieties of good quality and (2) new types of prune varieties is in progress.

In the diploid group, crosses have been primarily between hardy varieties and others of high quality but inferior hardiness.

Interspecific crosses were made between (a) the sloe and the diploid varieties Beauty and Santa Rosa (of the *Prunus salicina* type); (b) a hardy *P. sibirica* hybrid and Santa Rosa; and (c) Beauty and *P. besseyi*.

Combinations among the older material that have given promising progeny include Belgian Purple x Hackman, Jefferson x Belle de Louvain and Reine Claude d'Althaus x Jefferson.

Cherry. It is hoped to obtain extremely early forms by crossing early varieties. Other aims are (1) a bigarreau resistant to bacterial disease; and (2) a hardier sour cherry, to obtain which Vladimir 0-241 has been crossed with Ostheim, Montmorency and Brune de Bruxelles.

Peach. Breeding on a small scale is directed towards the production of early varieties of good quality and late flowering.

Hazel. The main desiderata are types with cold-resistant catkins and relatively large, well-filled nuts free from fibrous outgrowths.

Out of about 1500 older bushes, five types, C 2016, 2033, 2037, 2121 and 2461, were selected for their abundant yield, large nuts, early maturity, smooth, well-developed kernels and low habit of growth.

2362 BROOKS, R. M. & OLMO, H. P.
1953's new fruit varieties.

Amer. Fruit Gr 1954 : 74 : No. 1 : 26-27, 43-46.

Varieties of the following crops, abstracted from recent lists of the Register of New Fruit and Nut Varieties, are described briefly: apple, pear, cherry, peach, nectarine, persimmon, walnut, almond, avocado, raspberry, currant, blueberry, strawberry and grape.

2363 WELLINGTON, R., HOWE, G. H. & SLATE, G. L.

Fruit varieties originated at the New York State Agricultural Experiment Station, Geneva, NY.

Fruit Yearb. 1951-52 : 5 : 10-18.

An account of breeding at the above research station is given, and varieties of apple, pear, apricot, plum, cherry, nectarine, raspberry,

blackberry, strawberry and grapes suitable for cultivation in New York State are listed.

2364 JONES, T. H.

Fruits selected, bred for Tennessee growers.

Tenn. Fm Home Sci. 1953 : No. 6 : 6-7.

An account of the apple, pear, peach, raspberry, dewberry, strawberry and grape varieties suitable for Tennessee is given.

2365 Pubblicazioni inerenti il miglioramento genetico delle piante da frutto e da orto e problemi di tecnica colturale. (**Publications concerning the breeding of fruit and horticultural plants and problems of methods of cultivation**). Riv. Ortoflorofruttic. ital. 1953 : 37 : 518-26.

A brief introduction, outlining the research already done on the biology and genetics of various fruits and vegetables at the research centre attached to the Institute for Arboriculture, Florence, precedes a bibliography of 195 relevant Italian articles arranged by subject.

2366 MCINTOSH, D. L. & MELLOR, F. C.

Crown rot of fruit trees in British Columbia. II. Rootstock and scion resistance trials of apple, pear, and stone fruits.

Canad. J. agric. Sci. 1953 : 33 : 615-19.

The results of inoculating apple, plum, apricot, peach and cherry rootstocks and pear rootstocks and scions with a mixture of four isolates of *Phytophthora cactorum* obtained from apple are given. When a fifth isolate from sweet cherry was added to the inoculum the disease rating for mazzard cherry F-12-1 clonal stocks and *Pyrus robusta* seedlings rose on reinoculation (cf. PBA, Vol. XV, Abst. 508).

2367 HINRICH, H. A.

A summary of apple and peach variety trials in Oklahoma.

Bull. Okla. agric. Exp. Sta. 1953 : No. B-410 : Pp. 19.

Results, chiefly for yield, flowering date and harvest date, of trials of 71 apple varieties and 110 peach varieties are given. A number of varieties are discussed and those recommended for Oklahoma are indicated. Mention is made of yield in peaches in relation to frost damage.

2368 HILTON, S. A.

Progress Report of McDonald's Corner Horticultural Substation, New Brunswick, 1947-1952 : Pp. 14.

In addition to obtaining the following results, trials of apple, pear, plum, raspberry, gooseberry, and black currant have been set up.

Strawberry. The best yields have been obtained from Senator Dunlop, Dresden, Premier, Valentine and MacKenzie.

Tomato. Brief descriptions of the following varieties which appear well adapted to the New Brunswick area are given; Quebec # 5; Burpeeana Early Hybrid, Stokesdale # 4; Geneva John Baer, Bounty, Victor, Labrador # 66, Stokeschatham and Mustang.

Snap bean. Cherokee Wax, Topcrop, Logan Improved, Improved Commodore and Contender have given good results.

Pea. The best yields have been produced by Little Marvel, Director and Ottawa PE-1.

Sweet corn. Of 32 types tested Seneca 60, Kingcross Bantam TM-13, Gold Rusk and Seneca Arrow gave the best results.

2369 GARDNER, V. R. & CHRIST, E. G.
Studies on cracking in the Stayman apple.

Hort. News, NJ 1953 : 34 : 2701, 2710-12.
Stayman and its strains give rise to many variants. It is suggested that the low amount of cracking on apples of some branches of a tree compared with the large amount on other branches may be due to bud mutations.

2370 FRIEDRICH, G.
Untersuchungen über die Trieb- und Ertragsleistungen einiger Apfelsorten auf verschiedenen Malusunterlagen in Mitteldeutschland. (**Investigations of the performances and yields of some apple varieties on various Malus stocks in Central Germany**).
Arch. Gartenb. 1953 : 1 : 344-46.

Data on rate of growth, yield and resistance to frost are given for a number of scion varieties suitable for cultivation in Central Germany.

2371 ČERNENKO, E. S.
(**Apple trees bearing flowers without petals**).
Priroda (Nature) 1953 : No. 12 : 105-08. [Russian].

Abnormal pistillate flowers without a corolla or stamens were found on some hybrids between Pepin Litovskii [Lithuanian Pippin] and Anis. When pollinated, some flowers developed parthenocarpic fruits with a second shallow nidi at their tips. Seedlings raised from the seed taken from both nidi are under observation.

2372 Veredelingsdag voor de appel. (**Meeting of apple breeders**).
Fruittelt 1954 : 44 : 54-55.

The meeting was held in Wageningen on 12 January 1954. Among the speakers was J. J. M. Taminiau, who discussed the industrial

utilization of apples. Lemoenappel and Goudreinette [Golden Reinette] are the best varieties for preserving. Allington Pippin, Transparente de Croncels, Newton Pippin and Calville Lesans have a high pectin content.

2373 VISSER, T.
Optreden en anatomie van "klumpkevruchten" bij appels. (**Occurrence and anatomy of beaked fruits in apples**).
Meded. Dir. Tuinb. 1954 : 17 : 171-78.

Beaked fruit in apples is largely a genetically determined character, as in Gronsvelder Klumpke; external factors are largely responsible for beaked fruits in Cox's Orange Pippin and Laxton's Superb.

2374 KEITT, G. W.
Scab of apples.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 646-52.

Breeding for resistance to *Venturia inaequalis* is difficult as apple varieties vary in their susceptibility to the different lines of the fungus.

2375 DUNEGAN, J. C.
Bitter rot of apples.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 655-57.

Rome Beauty, Stayman Winesap, Delicious, York Imperial and Winesap are least susceptible to *Glomerella cingulata* but may be seriously affected in hot, rainy weather.

2376 PALMITER, D. H.
Rust diseases of apple.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 658-63.

York, Grimes, Ben Davis and Jonathan are resistant to *Gymnosporangium clavipes*. Stayman Winesap and Delicious are resistant to *G. juniperi-virginianae* and *G. globosum*. The fungi exist in a number of strains.

2377 DUNEGAN, J. C.
Blotch of apples.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 653-55.

Delicious, Golden Delicious, Grimes Golden, Jonathan, Stayman Winesap and Winesap are usually resistant to *Phyllosticta solitaria* but are occasionally affected seriously.

2378 VAN KATWIJK, W.
Enkele waarnemingen over de rubberziekte van appels. (**Some observations on the rubbery wood disease of apples**).
Meded. Dir. Tuinb. 1954 : 17 : 31-36.

An account of the disease is given. Golden Delicious, Lord Lambourne and James Grieve

are among the most susceptible varieties. It is hoped that selection will result in strains of these varieties with increased resistance to the virus.

2379 BAGENAL, N. B.

History and development of the cultivated fruits (part I).

Rev. Ass. Agric., Lond. 1954 : No. 22 : 5-10.

The cultivation of apples and the varieties grown in England up to 1876 are briefly discussed.

2380 MORETTINI, A.

Il miglioramento genetico delle razze di pero. (The genetic improvement of races of pear).

Riv. Ortoflorofruttic. ital. 1953 : 37 451-66.

The contributions made by pear breeders in Belgium, Italy, the USA and England, and by Mičurin in the USSR are reviewed.

In addition to the pear Santa Maria (William x Coscia 29), bred by the author (cf. *PBA*, Vol. XXII, Abst. 1385), he has in course of selection 43 different hybrids ripening at various times between July and November. Regional adaptation and superiority to existing varieties will determine the final choice.

Though the breeding of an earlier pear of the Coscia type is complicated by the fact that tendency to become over-ripe is a dominant character and correlated with early ripening, promising strains, somewhat earlier and without this defect, have been found among the breeding material.

Other seedlings from different genetic combinations are being studied with a view to obtaining (1) earlier, high yielding varieties of good quality and able to stand transport; and (2) new and better winter varieties, for the colder districts and mountainous parts of Italy where they would be immune to attack by *Ceratitis* and less subject to *Laspeyresia*.

2381 WOUTERS, O.

El Centro de Investigaciones Agronómicas del Sudoeste de Francia. (The Centre of Agronomic Research for the South-west of France).

Idia 1953 : No. 70 : 16-18.

An outline in Spanish is given of the work of this research centre, and particularly of the selection and breeding work with peaches, plums, and their rootstocks. A peach x apricot hybrid is proving of interest as a plum rootstock for controlling chlorosis in chalk soils. Sweet almonds flowering 10 days later than the

common almond have been obtained from the same cross.

2382 MURAWSKI, H. & BLASSE, W.

Untersuchungen an autotetraploiden Formen von *Prunus cerasifera* Ehrh. I. Morphologische, pomologische und zytologische Untersuchungen. (Investigations of autotetraploid forms of *P. cerasifera* Ehrh. I. Morphological, pomological and cytological investigations).

Züchter 1954 : 24 : 4-11.

Autotetraploid individuals with gigas growth were observed among the progeny of a cross between two lines of *P. cerasifera*. The leaves and petals of the $4n$ forms were broader and thicker than those of the $2n$ parents; investigation of the epidermal cells showed the $4n$ cells to be larger and indicated a positive correlation between chromosome number and cell size. The flowers of the $4n$ trees possessed an increased number of petals; fruit size was not changed. No disturbances were observed in mitosis. The possible value of the autotetraploids for future breeding purposes is discussed.

2383 KAZJMIN, G. T.

(The results of crossing *Prunus ussuriensis* with apricot or *P. tomentosa*).

Agrobiologija (Agrobiology) 1953 : No. 6 : 132-37. [Russian].

Material still under trial at Hubarovsk, Siberia, includes a hybrid between *P. ussuriensis* and apricot and hybrids between *P. ussuriensis* and *P. tomentosa*. The latter hybrids show resistance to *Rhodoseptoria*.

2384 HASKELL, G.

Stamen number and variation in diploid and tetraploid cherries.

Ann. Bot., Lond. 1954 : 18 : No. 69 : 95-111.

Stamen number was studied in diploid sweet cherries (*Prunus avium*, $2n = 16$), tetraploid Morello cherries (*P. cerasus*, $2n = 32$) and tetraploid Duke varieties. The most frequent number was 34, followed by 39 or 40. On the average, stamen number was lower in the Morello cherries than in the *P. avium* varieties. The Duke cherries had an intermediate number, confirming the suspected hybrid origin of this group. Each variety possessed a characteristic mean and pattern of variation in number. Under the same environmental conditions no intracloonal variation was shown. Selfed progeny of Bigarreau de Schrecken x Governor Wood exhibited polygenic segregation for stamen

number. Stamen number was not correlated with economic quantitative characters, but incompatibility groups I to VI tended to have lower numbers than groups VII to XII. It is suggested that stamen number could be used as an additional diagnostic feature in varietal and clonal identification.

2385 MORETTINI, A.

Altre due nuove razze di peschi Morettini: La Precocissima—La Gialla di Firenze. (Two further new Morettini peach varieties, Precocissima and Gialla di Firenze).

Riv. Ortoflorofruttic. ital. 1953 : 37 : 375–87.

See Abst. 1405.

2386 BRANZANTI, E. C. & RICCI, A.

Varietà di pesche promettenti in osservazione all'Azienda Zootecnica Ravennate dell'Ispettorato Provinciale dell'Agricoltura di Ravenna. I. Pesche: Maglia rosa, Dixired, Dixigem, Gialla di Piangipane. (Promising peach varieties under observation at the Ravenna Experimental Stock Farm of the Ravenna Provincial Inspectorate of Agriculture. I. The peaches Maglia rosa, Dixired, Dixigem and Gialla di Piangipane).

Riv. Fruttic. 1953 : 15 : 209–26.

Mention is made of a number of new peach varieties that have been tried in the Ravenna area of Italy but have failed to satisfy one or other of the requirements of the growers or to adapt themselves to the growth conditions of the region. Some are at least promising and descriptions are given of four of the best of them, all having yellow flesh. Maglia rosa [Pink Vest], a chance seedling from Hale, matures some 40 days before Hale; Dixired and Dixigem are American varieties and Gialla di Piangipane [Piangipane Yellow] is also thought to be a seedling of Hale, which it resembles in fruit type but precedes by 10–12 days in ripening. It is recommended for immediate planting, while the other three are undergoing further observation.

2387 NATIVIDADE, J. V. & COELHO, J. M. N. S. Melhoramento da flora fruteira portuguesa. I. Novas variedades culturais de pessegueiro. (Fruit breeding in Portugal. I. New cultivated varieties of peach).

Agron. lusit. 1953 : 15 : 39–64.

An examination of the merits of the various peach varieties, mostly American, that ripen before J. H. Hale shows that they leave much to

be desired in respect of adaptation to the climatic conditions of Portugal or of fruit quality and in 1941 a breeding programme designed to produce more suitable types was initiated. A preliminary selection of 12 promising seedlings has been made and these are described. The earliest is a seedling from Frei Bernado de Brito x Earliest of All and ripens three days after Triumph, bearing semiclingstone fruits of the Amsden type, superior in quality to other early peaches. The latest of the 12, a seedling from Temporão de Alcobaça [Alcobaça Early], ripens four days before that variety, which is the only Portuguese early peach and figures in the parentage of several of the seedlings described. In conjunction with the varieties Triumph, J. H. Hale, Frei Bernardo de Brito and Temporão de Alcobaça, the new seedlings make it possible to have a continuous supply of ripe peaches in Portugal from 1 June to 15 September.

2388 JUDKINS, W. P.

The Stoner peach.

Fruit Var. hort. Dig. 1949 : 4 : No. 2 : p. 46.

This new white-fleshed, freestone variety originated in Ohio from a bud mutation of Early Elberta. It produces a firm fruit of fine texture, has a vigorous growth and is resistant to brown rot.

2389 HU, C.-C.

Some descriptive and taxonomic characters of citrus fruits grown at Riverside, California, and Szechuan, China.

Taiwan Tahsueh Nunghsuehyuan Yenchiu Paokao/Mem. Coll. Agric. Taiwan Univ. 1953 : 2 : No. 5 : 105–33.

Detailed botanical and horticultural descriptions are given of the principal varieties of orange, lime, lemon, grapefruit, pommelo, mandarin and tangerine grown in the above two regions.

2390 KLOTZ, L. J. & CHILDS, J. F. L.

Foot rot of citrus trees.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 734–37.

The resistance of rootstocks to *Phytophthora citrophthora* is discussed.

2391 LITTAUER, F. & GUTTER, Y.

Diphenyl-resistant strains of *Diplodia*.

Palest. J. Bot. Rehovat 1953 : 8 : 185–89.

The isolate M 2088 did not develop in the presence of diphenyl but the diphenyl-resistant isolate "D" developed at a rate comparable to that of both the isolates without diphenyl. It

rotted Shamouti oranges wrapped in diphenyl-impregnated paper, but was less virulent and uniform in attack than M 2088 in the absence of diphenyl.

2392 CONDIT, I. J.

Twenty-five years of fig breeding.

Proc. 5th ann. Res. Conf. Calif. Fig Inst. 1951 : 23-26. (Mimeographed).

Of the commercial varieties, Kadota and Adriatic are best as parents. Back crosses to these parents have produced promising seedlings. Nonparthenocarpy is apparently dominant in the varieties Calimyrna, Kearney, Roeding 3, Stanford and Samson and in the two related species *Ficus palmata* and *F. pseudo-carica*. Caprifigs are being selfed and parthenocarpic caprifigs are being used as pollen parents, one objective being the development of a caprifig with hollow-centered mamme fruits.

2393 **Proceedings of the Seventh Annual Research Conference of the California Fig Institute, 1953** : Pp. 44. (Mimeographed).

Morgan, A. F. & Hall, A. P. *Vitamin content of figs*. (p. 34).

The vitamin B₆ content of fresh and dried figs of the varieties Adriatic, Calimyrna (caprifig and seedless), Kadota and Mission is given.

Powers, M. J. *Varietal comparison of fresh figs for freezing and preserve manufacture*. (pp. 35-38).

Black Mission is good for jam making. Adriatic figs have the highest ficin content.

2394 CONDIT, I. J.

Fig species and varieties.

Proc. 4th ann. Res. Conf. Calif. Fig Inst. 1950 : 25-26. (Mimeographed).

There are 150 species and varieties of fig under observation at Riverside to clarify nomenclature and develop superior varieties. A hybrid has been obtained between *Ficus pumila* and the common deciduous tree fig. Seedlings of the hybrid have been uninjured by temperatures down to 20° F. Back crosses have been made.

2395 SEKI, H.

(Cytological studies in the Moraceae. III. Triploid varieties among existing mulberry varieties).

Nihon Sanshigaku Zasshi/J. Sericult. Sci. Japan 1952 : 21 : 211-15. [Japanese].

Chromosome counts of 300 Japanese varieties showed that 70 were triploid. These varieties are classified according to the distribution of the sexes in the inflorescences. Cell and nuclear

size was greater in the triploids than in the diploids. A high frequency of trivalents was observed at metaphase in the pollen mother cells. The triploid pollen germinated very poorly.

2396 RAMASOMAYAZULU, M. V.

A promising guava (Lucknow No. 49) for the Agency tracts of the Andhra State.

Indian J. Hort. 1953 : 10 : 154-56.

The possibilities of extending guava cultivation in the Agency tracts of Andhra are discussed. Lucknow 49 was recently introduced in the Araku Valley. Establishment of regional stations for varietal studies in the different tracts is recommended.

2397 DUTTA, S.

Some guavas of Assam.

Indian J. Hort. 1953 : 10 : 137-39.

Short botanical descriptions of the seven varieties distinguished among collections in Assam are given, together with notes on their economic significance.

2398 PROVAS MALLIK

Life-history and characteristics of the new mango "Provasankar."

Proc. Bihar Acad. agric. Sci. 1953-54 : 2-3 : 125-27.

Provasankar is a hybrid between Bombai and Kalapady, obtained at Sabour. Descriptions of the hybrid and its parents are given. The hybrid has the flavour of Bombai plus late ripening and good keeping qualities and has so far borne fruit annually.

2399 ROY, R. S.

Study of irregular bearing of mango (*Mangifera indica*).

Indian J. Hort. 1953 : 10 : 157-60.

It is mentioned that in some varieties, such as Dalma and Sukul, annual bearing appears to be genetically determined. In breeding in Bihar, progress has been made in developing intervarietal hybrids combining desirable time of maturity, annual-bearing habit and good fruit quality (cf. PBA, Vol. XXII, Abst. 2218).

2400 STRITZKE, S.

Grundlagen für eine erfolgreiche Ausweitung des Walnussanbaues in Mitteldeutschland. (Foundations for a successful expansion of walnut cultivation in central Germany).

Arch. Gartenb. 1953 : 1 : 407-16.

An account of breeding and grafting experiments at the Institute of Horticulture, Dresden-Pillnitz, is presented. Selection for yield, quality, vigorous growth and resistance to

frost has given several valuable strains, of which Pi W 1, Pi W 6, Pi W 16 and Pi W 18 are the most prominent.

2401 FISCHER, F.

Die Nachzucht des Nussbaumes als Waldbaum. (*Juglans regia* L. und *Juglans nigra* L.). [The cultivation of the walnut as a forest tree (*J. regia* L. and *J. nigra* L.)].

Mitt. schweiz. ZentAnst. forstl. Versuchsw. 1953 : 29 : 267-92.

Experiments were carried out to determine whether the walnut could be grown as a forest tree in the Otelfingen and Riehen districts of Switzerland, and which varieties were most suitable. *J. regia* was superior to *J. nigra*. Aeppli (*J. regia*) gave the best tree shape in both localities, and showed the fastest rate of growth in Otelfingen. In Riehen, Stans, belonging to the same species, was the fastest growing variety.

2402 ŠČEPOTJEV, F. L.

(Use of pollen mixtures in distant hybridization of the walnut).

Agrobiologija (Agrobiology) 1953 : No. 4 : 142-44. [Russian].

In the Kirovograd province, two adult trees of *Juglans regia* showed different degrees of cross compatibility when pollinated with *J. mandshurica*, *J. cinerea* or the mixed pollen of these species.

2403 MOLOTKOVSKIĬ, G. H. & MOLOTKOVSKIĬ, JU. G.

(Development of perfect flowers on a walnut tree flowering for the second time).

Bjull. mosk. Obšč. Ispyt. Prirod. (Bull. Moscow Soc. Nat.) 1952 : 57 : No. 5 : 74-78. [Russian].

At Černovicy, inflorescences bearing staminate, pistillate and perfect flowers were found upon a plant flowering for the second time. The occurrence of perfect flowers is attributed to atavism.

2404 COLE, J. R.

Problems in growing pecans.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 796-800.

Stuart is highly resistant to, or is a symptomless carrier of, bunch disease. Moneymaker is usually resistant to pecan rosette.

2405 REED, C. A.

Chestnut varieties.

Fruit Var. hort. Dig. 1949 : 4 : No. 2 : 35-39.

Data on yield, maturity, quality and disease

resistance are presented for the varieties Abundance, Carr, Colby, Conard, Hemming, Hobson, Kuling, Meiling, Nanking, Milford, Stoke and Zimmerman.

2406 Return of the chestnut.

Agric. Res., Wash. 1953 : 2 : No. 6 : 3-4.

Blight-resistant hybrids have been bred by crossing the American chestnut with the resistant Chinese chestnut. The back cross to the Chinese parent produced progeny with even greater resistance.

2407 SLATE, G. L.

Filberts.

Fm Res. 1954 : 20 : No. 1 : p. 5.

The results of a variety test, begun in 1925 at Geneva, NY, are briefly reported. In general, German varieties were superior to French varieties in all respects, and to English varieties in hardiness. Italian Red, Cosford and Medium Long were among the most satisfactory varieties. It is mentioned that the test provided the basis of a breeding project which has resulted in some promising selections.

2408 WILSON, E. E.

Apricot and almond brown rot.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 886-91.

The almond varieties Nonpareil, Peerless and Texas and the plum varieties Imperial, Robe de Sergeant and Sugar are resistant to *Monolinia laxa*.

2409 ZOHARY, M.

A monographical study of the genus *Pistacia*.

Palest. J. Bot., Jerusalem 1952 : 5 : 187-228.

A key to the species of *Pistacia* and a table of their geographical distribution are given. The species are described. Chromosome numbers given for the first time are *P. lentiscus* $2n = 24$, *P. atlantica* var. *latifolia* $2n = 28$ and *P. vera* $2n = 30$. The lines of evolution and migration in the genus are described. *Haplorhus* is the nearest related genus to *Pistacia*, both being isolated within the *Rhoideae*. *Pistacia* is divided into one group comprising the Sections *Euterebinthus*, *Bulmela* and *Lentiscella*, and a second group comprising the Section *Eulenticus*. The first group arose from *P. vera* and its direct descendant *P. khinjuk*. The second group is said to have arisen in Tibet in Cretaceous times and is morphologically more advanced than the first.

2410 JOHANSEN, E. L.

Embryo and seed failure following hybridization of *Arachis hypogaea* and *A. diogoi*.

J. Elisha Mitchell sci. Soc. 1953 : 69 : p. 86. (Abst.).

Fertilization occurred in the cross between the above two species and hybrid embryos and endosperms both developed for a time. The integuments, however, grew rapidly and became abnormally thickened, eventually leading to the destruction of the embryo and endosperm.

2411 HAMMONS, R. O.

***Arachis hypogaea*. Behavior of the induced mutant, Cup.**

J. Elisha Mitchell sci. Soc. 1953 : 69 : 84-85. (Abst.).

A mutant characterized by involute leaflets with a cup-like arrangement and by succulent, easily-broken stems was induced by X irradiation of the seeds. The mutant depended upon a single recessive gene (*cu*), which was subject to the effect of modifiers.

2412 LARROQUE, P., CHAUSSON, J. & GALLAND, PH.

Sélection des arachides. Résultats obtenus en Casamance et au Moyen-Congo. (Groundnut selection. Results obtained in Casamance and the Middle Congo).

Oléagineux 1954 : 9 : 1-6.

Experiments with the variety M'Bambey 28206 at Séfa, in the Casamance district of Senegal, have shown the method of rapid selection based upon associated groups of phenotypic characters, or hereditary complexes, to be promising (cf. *PBA*, Vol. XIX, Abst. 1994 and Vol. XX, Abst. 528). Selection over three generations resulted in the improvement of desirable agronomic characteristics and in increased homogeneity.

2413 TARDIEU, M. & THÉVENIN, L.

Études chromosomiques. I. Arachide. II. Mils (*Pennisetum* et *Sorghum*). [Chromosome studies. I. Groundnut. II. Millets (*Pennisetum* and *Sorghum*)].

Ann. Centre Rech. agron. Bambey 1952. Bull. agron. Fr. d'out. mer 1953 : No. 8 : 98-105.

The chromosome number in seven populations and lines of varieties representing different types of *Arachis hypogaea* (cf. *PBA*, Vol. XX, Abst. 1896) has been found to be $2n = ca. 40$. Caryograms illustrate the differences in chromosome size. The possibility of polyploidy following

treatment with fungicides may need further investigation, though examination of abnormal, large, or double or triple roots has shown that such anomalies are not necessarily accompanied by cytological aberrations.

In a study of the chromosomes in six species of *Pennisetum* and eight of *Sorghum*, $2n = 14$ was confirmed for the former, and for the latter $2n = 20$.

2414 NISHIMURA, S. & KATSUMATA, H.

(Studies on peanut breeding. I. On crossing technique and the percentage fruit set).

Ikushugaku Zasshi/Jap. J. Breeding 1952 : 2 : 37-41. [Japanese].

The authors' method for emasculating and pollinating peanut varieties is described. Pollen is liberated under natural conditions from 9.0 p.m. to 2.0-3.0 a.m. Crossing studies involving American and Japanese varieties showed that, whereas the female variety had little effect on fruit set, considerable differences were brought about by using different pollinators.

2415 TANG, W.-T. & CHIANG, S.-M.

(Comparative studies on certain characters of small and large seeded peanuts. I.).

Taiwan Tahsueh Nunghsuehyuan Yenchiu Paokao/Mem. Coll. Agric. Taiwan Univ. 1953 : 2 : No. 5 : 23-33. [Chinese].

A series of 26 varieties could be classified into large and small seeded groups. Large seed is correlated with (1) longer hypocotyl in sunlight, (2) shorter hypocotyl in darkness, (3) smaller leaflets, and (4) thicker leaflets.

2416 SARDAR SINGH

Some activities of the Institute of Plant Industry, Indore.

Indian Fmg 1953 : 3 : No. 9 : p. 22.

An indigenous groundnut variety TMV-4 has averaged a 30% higher yield than AK 12-24. Varieties from Argentina and South Africa have given a 15-40% higher yield than TMV-4. High-yielding varieties matured earlier, had a higher shelling percentage, smaller pods and seeds, lighter green foliage and larger leaflets than low-yielding varieties.

2417 WILSON, C.

Preventing the diseases of peanuts.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 448-54.

Dixie Runner is highly resistant to the fungi causing concealed damage.

- 2418 EVANS, A. C.
Groundnut rosette disease in Tanganyika.
 Ann. appl. Biol. 1954 : 41 : 189-206.

The paper includes an account of experiments on varietal resistance, undertaken in the Southern Province of Tanganyika by the Overseas Food Corporation. Selections of the groundnut variety Mwitunde showed the lowest incidence of rosette symptoms and gave the highest yields during 1952. The Mwitunde types appear to be less favourable hosts for aphids than other varieties; selection of these mixed types might result in high yielding vector-resistant strains. A method of experimental layout for varietal testing is described which, in contrast to the orthodox small-plot trial, ensures a uniform initial infection by aphids and the accurate estimation of the secondary spread of the disease.

- 2419 LIGON, L. L.
Peanut varieties for Oklahoma.
 Bull. Okla. agric. Exp. Sta. 1953 : No. B-404 : Pp. 15.

Results of trials are given together with tables showing the comparative oil and protein content. Argentine, Dixie Spanish, Spanish 18-38 and Spantex are recommended for growth in Oklahoma on the basis of these trials and are briefly described.

- 2420 YORK, J. O. & WISER, W. J.
Peanut performance tests, 1944-52.
 Rep. Ser. Ark. agric. Exp. Sta. 1953 : No. 39 : Pp. 15.

Experiments were carried out in northwest and southwest Arkansas from 1944 to 1952 to compare the nut and hay yield and shelling percentage of three types of varieties and strains, (1) small-podded Spanish types, (2) slender-podded Red Valencia, Tennessee Red and Virginia Runner and (3) large-podded Virginia Red, Virginia Jumbo and African strains. The Spanish varieties were recommended as best for Arkansas conditions.

- 2421 BHAVANI SHANKER RAO, M. & KOYAMU, K.
Hybrid vigour in coconut seedlings.
 Indian Cocon. J. 1952 : 6 : 41-44.

Crosses between tall and dwarf coconuts have been made at the coconut research stations in Madras. The one-year-old F_1 seedlings showed heterosis in collar girth and height.

- 2422 LIYANAGE, D. V.
An isolated seed garden for coconuts.
 Ceylon Cocon. Quart. 1953 : 4 : 59-60.

An isolated seed garden containing only high-

yielding palms is recommended for seed production. By further mass selection, seed gardens of yet higher standard could be planted later.

- 2423 KEBBY, R. G.
Papaw culture.
 Agric. Gaz. NSW 1953 : 64 : 518, 560, 566-69.

This article includes a short popular account of a method of line breeding, based on the genetics of sex inheritance. A bisexual tree of the *elongata* type is selected as the initial parent and self-pollinated. The selfed progeny consists of approximately 66% bisexuals and 33% females. Seed from pollinations of the females of this first generation by the bisexuals produces 50% females and 50% bisexuals, which in turn, when mated as in the previous generation, give rise to progeny comprising 50% females and 50% bisexuals. These females produce the best type of fruit. Having established the breeding line, the grower need only maintain the standard *elongata* parents and second generation females.

- 2424 HAMILTON, R. A.
Progeny studies with two Solo papaya strains.
 Diss. Abstr. 1953 : 13 : Publ. No. 5349 : p. 460.

By means of a recessive autosomal character of the leaf, it was shown that the commercially preferred pyriform fruits, produced by hermaphrodites only, were the result of selfing through bud pollination.

Experiments were carried out to study the effect of the following upon quantitative characters: (1) sex, (2) strain, (3) inbreeding and hybrid vigour, and (4) combining ability. Progenies were obtained from self and cross pollinations involving two hermaphrodites and one female from each of two strains of Solo, an I_7 inbred and an open-pollinated commercial strain. The progenies segregated for females and hermaphrodites in the ratios expected. Marked differences between sexes with respect to the characters studied were observed; only data from hermaphrodites were therefore used in progeny testing. Differences in earliness between strains and between the hybrid-progeny means of individual parent trees were negligible. Comparisons of appropriate progenies provided no evidence of loss of vigour due to inbreeding or of F_1 hybrid vigour. As female parent the commercial strain was superior in combining ability to the hermaphrodites of the strain; it also bore its fruits at

a lower level, more convenient for picking, and transmitted the character to its progeny.

2425 ZENTMYER, G. A.

Diseases of the avocado.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 875-81.

Fuchsia, Pollock, Booth 1, Waldin, Itzamma, Linda and Collinson are moderately resistant to *Sphaceloma perseeae*.

2426 SCOTT, D. H. & DARROW, G. M.

Brambles. Newer varieties, resistant to disease, are winning attention.

Amer. Fruit Gr 1954 : 74 : No. 1 : 36-38.

The varieties grown in the chief bramble-producing regions of the USA are discussed. The newer varieties and disease-resistant varieties are mentioned.

2427 HASKELL, G.

Quantitative variation in subsexual *Rubus*.

Heredity 1953 : 7 : 409-18.

Variation in some quantitative characters was studied in two pseudogamous subsexual families of *R. nitidioides*, viz. family 31, raised from seed of closely similar open-pollinated plants, and family 32, obtained by selfing a single selected plant. Family 32 showed no inbreeding depression as the result of selfing. Histograms for plant vigour and frequencies of mean prickles per internode indicated that family 31 consisted of a series of separate apomictic segregating populations, and that family 32 comprised a single segregating population. The times at which the first flowers and ripe fruits were produced were similar and highly uniform in both families; the correlation between these two characters was, however, weak in the case of individual plants. The ranges in variation of the two families were compared by plotting prickles per internode against flowering times. Both families showed similar ranges. Variation, although detectable, was extremely limited and could be ascribed to autosegregation rather than to true sexual segregation. The significance of autosegregation in breeding and the possibility of effective selection within subsexual families, e.g. for reduced prickles per internode, are discussed.

2428 JINNO, T.

(Chromosome numbers in *Rubus*. I.).

Senshokutai (Chromosome)/Kromosomo 1951 : Nos. 9-10 : 360-61. [Japanese].

The following counts are reported: *R. hirsutus*

and *R. parvifolius*, $2n = 14$; *R. sieboldii*, 28; *R. pectinellus*, 42; and *R. buergeri*, 56.

2429 JEFFERS, W. F.

Diseases of berries in the east.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 775-83.

Varietal resistance of *Rubus* species to *Verticillium albo-atrum*, mosaic and *Elsinoe veneta* is mentioned.

2430 JOHNSON, F.

Diseases of berries in the west.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 770-75.

The raspberry varieties Williamette and Tahoma are resistant to *Phragmidium rubi-idaei*. The Cuthbert dewberry is tolerant of *Verticillium albo-atrum*, and clones of the wild trailing blackberry, Logan, Mammoth, Chehalem, Himalaya and Cutleaf Evergreen are resistant.

2431 OVERCASH, J. P.

Raspberry variety sought for Mississippi conditions.

Miss Fm Res. 1953 : 16 : No. 12 : p. 5.

Breeding and selection are being executed to produce raspberry varieties adapted to the hot, dry conditions in Mississippi. Three oriental species, *Rubus biflorus* and *R. kuntzeanus*, upright types, and *R. parvifolius*, a trailing type, have been used in crosses to obtain plant vigour.

2432 NEWBERG, W. B., JOHNSON, J. & SMITH, W.

Strawberry and raspberry varieties.

Proc. Ore. hort. Soc. 1951 : 66 : 89-91.

The respective merits of several varieties are compared and data on yield, drought and virus resistance, quality and suitability for canning and freezing are presented for the strawberries Northwest, Marshall and Brightmore and for the raspberries Williamette and No. 549.

2433 VAN DER MEER, F. A.

De incubatie-tijd van de dwergziekte bij verschillende frambozenrassen. (On the incubation period of *Rubus* stunt in different raspberry varieties).

Tijdschr. PIZiekt. 1954 : 60 : 69-73.

Of fifteen varieties tested at Breda, Netherlands, in 1951, Lloyd George, Malling Promise and Taylor proved least susceptible to *Rubus* stunt.

2434 Blackberry developed.

Amer. Nurserym. 1953 : 98 : No. 10 : p. 43.

In addition to its advantage in not producing "nubbins", Jerseyblack (NJ 16), a thorny semitrailing type, bears medium-sized to large

berries of good quality (cf. *PBA*, Vol. XXIII, Abst. 1460). At the New Jersey Agricultural Experiment Station, the peak for harvesting is reached on approximately 25 July.

2435 New dewberry raises income. Research and farming.

Progr. Rep. NC agric. Exp. Sta. 1952 : 11 : No. 2 : p. 6.

The new Carolina dewberry is more vigorous and disease resistant than Lucretia and has a higher sugar content.

2436 NEUMANN, U.

Untersuchungen über die Ursachen des vorzeitigen Fruchtefalls bei Schwarzen Johannisbeeren. (**Investigations into the causes of premature fruit drop in blackcurrants**).

Kühn-Archiv 1953 : 67 : p. 402.

Investigations at the German Academy of Agricultural Science, Berlin, indicated that fruit drop is partly attributable to insufficient natural pollination and may be reduced by artificial pollination. Varietal differences in susceptibility to fruit drop were noted; Westwicks Triumph [Westwicks's Triumph] was the least susceptible of the varieties observed. In general, varieties with short racemes suffered less from fruit drop than those with long racemes.

2437 DEMENTJEVA, M. I.

(**Resistance of gooseberry to a group of diseases**).

Dokl. Akad. sel'skokochozjaistv. Nauk Lenin. (Proc. Lenin Acad. agric. Sci.). 1953 : No. 6 : 32-34. [Russian].

At the Timirjazev Agricultural Academy, the gooseberries Mičurinskii [Mičurin], Black Negus, Haughton, Carry, Pjatiletka [Five Year Plan], Mysovskii 17 [Bay 17] and Mysovskii 37 showed a high degree of resistance to *Sphaerotheca*, *Botrytis*, *Gloeosporium*, *Puccinia* and a physiological wilt. Varieties resistant to any one of the above diseases are thought to be resistant to all the others.

2438 GOHEEN, A. C.

The cultivated highbush blueberry. Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 784-89.

Angola, Wolcott, Murphy, Scammell, Atlantic, Ivanhoe, Jersey, Rubel and Rancocas are sufficiently resistant to *Physalospora corticus* for commercial use.

2439 Strawberry for Dixie.

Agric. Res., Wash. 1954 : 2 : No. 7 : p. 12.

The new variety, Dixieland, originated from a

cross between Tennessee Shipper and Midland and was developed by the United States Department of Agriculture and the North Carolina Agricultural Experiment Station. The fruits are medium to large, uniform in shape, firm, tough-skinned, glossy, have a strong to vivid red colour and a good acid flavour. They ripen about the same time as Blakemore. In freezing tests they are rated high in flavour, texture and colour. The plants are vigorous and in the area of adaptation from Maryland to North Carolina and west to Arkansas and Missouri they yield better than those of most other varieties.

2440 Strawberry for South: Pocahontas. Agric. Res., Wash. 1953 : 2 : No. 6 : p. 7.

Research work and workers.

Seed World 1954 : 74 : No. 2 : p. 22.

KENNEDY, F. A.

The word from Washington.

Sth. Seedsman 1954 : 17 : No. 1 : 15, 59.

Pocahontas is a new midseason variety developed from a cross between Tennessee Shipper and Midland by the Agricultural Research Service and the Virginia Truck Experiment Station. It is high yielding and suitable for freezing. Compared with Blakemore the berries are larger and a deeper red but ripen 5-7 days later. The plants grow vigorously, producing a large number of runners.

2441 PETERSON, R. M.

Breeding behavior of the strawberry with respect to time of blooming, time of ripening, and rate of fruit development.

Diss. Abstr. 1953 : 13 : Publ. No. 5366 : p. 462.

Seven inbred selections were selfed and intercrossed in all possible combinations. The three features studied behaved as quantitative characters; no heterotic effects were detected. For each character, highly significant differences were found between the means of the progenies of different parents. In general, the parents fall into the same relative order whether their breeding behaviour for a given character was estimated by tests of general combining ability, specific combining ability or selfed progenies. It was concluded, however, that in testing breeding value, the use of selfed progenies affords advantages in efficiency and discrimination. The data further indicated that each of the three characters offered considerable opportunity for independent selection.

- 2442 YAMATO, M., GORYU, K., IMASAWA, F. & TAKANO, T.
(Studies on the regional adaptability of strawberry varieties. I. On the effects of different climatic conditions during the period of flower-bud differentiation on the formation and development of the flower clusters and flower buds).
Engeigaku Kai Zasshi/J. hort. Ass. Japan 1953 : 22 : 153-62. [Japanese].
A comparative morphogenetic study of the inflorescence of three Japanese varieties is presented, and the effect of temperature on the developmental sequence elucidated. Berry yield depends on the number of inflorescences formed.
- 2443 JEFFERS, W. F. & SCOTT, D. H.
Red stele disease of strawberry.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 760-65.
The breeding of varieties resistant to races of *Phytophthora fragariae* is described and resistant varieties are mentioned.
- 2444 BERGMAN, H. F.
Disorders of cranberries.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 789-96.
Mention is made of American work on breeding cranberries for resistance to false blossom.
- 2445 SIMMONDS, N. W.
Anthocyanins in bananas.
Nature, Lond. 1954 : 173 : 402-03.
The results of a paper-chromatographic analysis of the anthocyanins in several species of *Musa* are given. Clones of *M. acuminata* from various regions between Java and Burma show a cline for bract colour, ranging from red in the southern part of the area to dull purple in the north; this cline is an expression of changing proportions of the anthocyanidins. Edible bananas have, broadly speaking, the pigments expected on taxonomic grounds. Thus, cultivated varieties of *M. acuminata* have, with one exception, partly methylated mixtures of cyanidin and delphinidin, whereas the pigments of varieties allied to, but not necessarily wholly derived from, *M. balbisiana* are not methylated.
- 2446 SHEPHERD, K.
Seed fertility of the Gros Michel banana in Jamaica.
J. hort. Sci. 1954 : 29 : 1-11.
Seed fertility was low and varied with season, locality, soil composition, size of inflorescence, degree of pruning and time of pollination. Proximal fruit clusters and thin bananas were the most fertile.
- Seeds were found chiefly at the stylar end of the fruit. Only a small proportion of the ovules contained embryo sacs and in general the growth of the pollen tubes was considerably slower and more erratic than those of *Musa acuminata* which was used as a standard.
- 2447 SIMMONDS, N. W.
Classification of the bananas. III. Critical notes on species. t.
Kew Bull. 1953 (1954) : 571-72.
In continuation of the series by E. E. Cheesman (cf. *PBA*, Vol. XXI, Absts. 1358-9), the author describes the new species *Musa erecta* ($2n = 20$) from Buka Island, northern Solomon Islands. The species has affinity with *M. fehi*.
- 2448 SIMMONDS, N. W.
Classification of the bananas. III. Critical notes on species. u.
Kew Bull. 1953 (1954) : 573-74.
The new species *Musa angustigenma* ($2n = 20$), from the Rai coast, Madang, northeastern New Guinea, is described. The species is related to *M. peekelii* from New Ireland.
- 2449 BROWN, F. B.
Pineapple varieties and selection in Malaya.
Malay. agric. J. 1953 : 36 : 237-46.
The Malayan varieties Singapore Spanish Pine, Mauritius and Sarawak are described. The qualities desirable to growers and canners for which selection should take place, and methods by which desirable types can be propagated are discussed.
- 2450 SINJUHIN, A. M.
(Origin of a new organism within an existing one).
Izv. Akad. Nauk SSSR (News Acad. Sci. USSR) 1953 : No. 5 : 16-38. [Russian].
Further details of the development of new cells from noncellular living substance in *Physalis* (cf. *PBA*, Vol. XXIII, Abst. 2334) are presented.
- 2451 MANSFELD, R.
Die Obst liefernden Blasenkirchen (*Physalis*). [The fruit bearing ground cherry (*Physalis*)].
Züchter 1954 : 24 : 1-4.
Information on the morphological characteristics and topographical distribution of the three edible species *Ph. ixocarpa*, *Ph. peruviana* and *Ph. pruinosa* is given.
- 2452 Colchicine: drug produces plant changes fast that could take countless ages in nature.
Amer. Nurserym. 1954 : 99 : No. 2 : 12-13.
This short popular account of the practical value

of the colchicine technique includes a description of H. Dermen's recent work on the induction of tetraploid grapes at the Plant Industry Station, Beltsville, Md. Some of the tetraploids, with increased size of fruit, may eventually become commercial varieties. Others will provide material for further breeding.

- 2453 KOČURA, I. I.
(**Vines in the Poltava province**).
Sad i Ogorod (Gdn. & Veg. Gdn.). 1954 :
No. 2 : 72-73. [Russian].

Mention is made of Lubenskii Belyi [White Lubna], raised from the seed of an unknown variety at Lubna. It resembles White Chasselas, but its grapes have a thinner skin and a higher sugar content. It reaches maturity in August.

- 2454 VEGA, J. & MAVRICH, E. G.
Identificación de clones en cultivos del
portainjerto vitícola Riparia x Rupestris
101/14 M. G. (**Identification of clones
in plantations of the vine rootstock
Riparia x Rupestris 101/14 MG**).
Idia 1953 : No. 66 : 17-25.

Various examples are cited of vine rootstock varieties that have proved heterogeneous; detailed observations of variety 101/14 revealed the existence of five distinct clones, which are described and illustrated, in addition to the basic type. Indications are given of certain features which all clones possess in common and of characters which distinguish them from other varieties of the same parentage.

- 2455 Biohimija vinodelija. (**Biochemistry
of Wine Production**).
Akad. Nauk SSSR, Moskva 1953 : No. 4 :
Pp. 257. [Russian].
Saakjan, R. G. (*The physiological-
biochemical characteristics of frost resist-
ance in vines*). (pp. 226-35).

Examination of the leaves of a number of vine varieties showed that frost-resistant varieties possessed greater peroxidase activity than susceptible varieties at all stages of development. No difference was detected in polyphenol oxidase. In the spring, the hardy varieties showed higher contents of sucrose and lower monosaccharide contents than susceptible varieties.

Marytjan, S. A. (*The biochemical char-
acteristics of earliness and lateness in
the vine*). (pp. 236-49).

Analyses of ten varieties of vine differing in time of maturity showed that in fruiting vines the early-maturing varieties were characterized by greater activity in synthesis and hydrolysis of sucrose in the leaves than late varieties.

This difference was not observed in young vines that had not come into bearing. In all stages the sucrose content was greater in late than in early forms, but in the spring the amount of monosaccharides in the shoots diminished in late varieties and increased in early, so that the ratio of sucrose to monosaccharides was 10 times greater in spring than in autumn in late vines and only 2-4 times greater in early. The total water-soluble carbohydrates in spring were much greater in early than in late varieties; in late varieties the amounts of sucrose and monosaccharides were roughly equal in the spring and the ratio of sucrose to monosaccharides was twice that of early varieties.

There was no clear correlation between peroxidase or polyphenol oxidase activity and earliness or lateness, but there were indications that the dehydrogenases of various acids were more active in early than in late varieties.

- 2456 RIBÉREAU-GAYON, P.
Différenciation des matières colorantes
des raisins et des vins des cépages
français et hybrides. (**How to distin-
guish between the colouring matter
of grapes and wines of French and of
hybrid vines**).

CR Acad. Agric. Fr. 1953 : 39 : 800-07.

A combined chromatographic and biochemical method, based on the separation of the anthocyanins present, has been devised for distinguishing grapes and wines from French and from hybrid vines.

- 2457 GUICHARD, C.
Contribution à l'étude des glucides de
la vigne et de certains fruits. (**Contri-
bution to the study of the sugars of
the vine and of certain fruits**).
Rev. gén. Bot. 1954 : 61 : 16-67, 96-127.

The pH concentration, proportion of reducing sugars and sucrose concentration of a number of grape varieties and hybrids of different provenance are tabulated. Sucrose was found to be always present in Sémillon, Sauvignon and Muscadelle. Similar data are presented for several apple varieties.

- 2458 VAN STAALDUINE, D.
Het rassenvraagstuk bij druiven. (**The
variety problem in grapes**).
Fruittelt 1954 : 44 : 284-86.

Agronomic data on varieties suitable for cultivation under glass in the Netherlands are given. Black Alicante and Golden Champion are the most favoured of the black and white grapes, respectively.

- 2459 BRANAS, J.
Amélioration variétale des raisins de table. (**Varietal improvement of dessert grapes**).
Progr. agric. vitic. 1953 : 70 : 109-15; 139-48.

The subject of the author's address to the Seventh National Congress on Dessert Grapes, held in France, is here treated more fully. The role of selection, bud sports, acclimatization and breeding, including hybridization and possibly polyploidy, in improving dessert grapes is briefly indicated. Results already obtained by hybridization in Hungary, Italy, Portugal, France, Argentina and the USA are also summarized, with a brief note on the present position of vine breeding in France.

- 2460 SCHELLENBERG, A.
Folgen des Frostschadens vom 10. auf den 11. Mai 1953 für das Sortiment von Tafeltrauben im Korbtrebbenberg Rheinau. (**Results of frost damage from 10 to 11 May 1953 to the dessert grape assortment in the Rheinau trellis vineyard**).
Schweiz. Z. Obst. u. Weinb. 1954 : 63 : 75-77.

A list of varieties suitable for cultivation in Rheinau, eastern Switzerland, is given, together with varietal differences in susceptibility to frost damage.

- 2461 BRAUN, A. J.
Ills of the American bunch grapes.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 754-60.

Partial or complete resistance to *Guignardia bidwellii* is found in Campbell Early, Clinton, Delaware, Diamond, Eaton, Elvira, Fredonia, Ives, Missouri Riesling, Moore Early and Portland.

- 2462 LIDER, L. A.
Inheritance of resistance to a rootknot nematode (*Meloidogyne incognita* var. *acrita* Chitwood) in *Vitis* spp.
Proc. helm. Soc. Wash. 1954 : 21 : 53-60.

The reaction of *Vitis* species; used as rootstocks, to 18 collections of *M. incognita* var. *acrita* at the University of California showed that racial differences existed in the nematode collections. It appeared from crossing experiments that *V. vinifera* and *V. labrusca* were homozygously susceptible to nematodes whilst *V. candicans* carried dominant homogygous resistance and *V. champini* heterozygous resistance. *V. solonis*

and *V. rotundifolia* also showed considerable resistance.

FORESTRY

- 2463 SCHÖNBACH
Bauernwald und Forstpflanzenzüchtung. (**Farmers' woods and forest tree breeding**).
Dtsch. Landw., Berl. 1953 : 4 : 660-64.

The importance of breeding strains adapted to the particular environment in which they are to grow is discussed and it is stressed that only certified seed should be used in replanting. In many cases genetically valuable local strains have been lost through intensive felling of whole forests. Scattered trees on farms may, however, have been spared and can provide a source of locally adapted breeding material.

- 2464 Sällskapet för Praktisk Skogsförädling. (**The Society for Practical Forest Improvement**).
Skogst 1954 : 41 : 89-90.

The foundation of the Society in 1941 and its functions are described. Its work includes the selection of plus trees for multiplication and the establishment of seed plantations; the production, under favourable maritime conditions, of mature seed from grafted material of the best trees growing at high altitudes, where good seed is rarely produced; and the classification of Swedish forests from the standpoint of seed collection.

- 2465 LITTLE, E. L. (JUN.).
Check list of native and naturalized trees of the United States (including Alaska).
Agric. Handb. US Dep. Agric. 1953 : No. 41 : Pp. 472.

The list provides information on the accepted scientific names, current synonyms, common names, and ranges of the native and naturalized trees of the United States.

- 2466 SHULL, G. H.
Chloralbinism in the burr oak [*Quercus macrocarpa* (Michx.)] and its putative modification through grafting.
Genetics 1953 : 38 : 690-91. (Abst.).

A tree of *Q. macrocarpa*, evidently heterozygous for albinism, produced green and completely albino seedlings in the ratio of 129 : 1, in a population of nearly 2000. This small proportion of albinos is explained by assuming that most of the effective pollen came from a neighbouring tree homozygous for normal

green seedlings, since in general oaks are largely self-incompatible. When grafted with normal sibs, the leaves of the albinos showed some chlorophyll development after two weeks or a longer period.

2467 PJATNICKII, S. S.

(Mass production of hybrid acorns).

Les. Hoz. (Forestry) 1952 : No. 8 : 42-44. [Russian].

Mention is made of three drought-resistant oak hybrids with increased timber production, obtained at the Ukrainian Forestry Institute by crossing *Quercus macranthera* with *Q. robur*, *Q. macrocarpa* and *Q. borealis*. The hybrids have been named after Vysockii, Timirjazev and Mičurin.

2468 SEITZ, F. W.

Über das Auftreten von Triploiden nach der Selbstung anomaler Zwitterblüten einer Graupappelform. (On the occurrence of triploids after the selfing of anomalous hermaphrodite flowers of a grey poplar).

Z. Forstgen. Forstpflanzenz. 1954 : 3 : 1-6.

Two thousand selfed seedlings of the hermaphrodite clone discovered in Dillingen (cf. *PBA*, Vol. XXII, Abst. 3013 and Vol. XXIII, Absts. 1486 and 2997) were raised, and 19 triploids, together with 7 chimeras with mixed triploid and diploid tissue, were obtained, the remaining plants being diploid. The triploids arose from unreduced pollen cells. The chimeras appeared to be the result of a partial reversion of triploid plants to a diploid condition, thus supporting the theory of allopolyploidy for these plants. The triploids had larger leaves than the diploids, and tended to possess fewer leaves per given length of stalk. Many of the diploids displayed leaf aberrations, and varied from types with long pointed leaves to types with rounded obtuse leaves, the latter form indicating the activity of the aspen genome. It is hoped that a study of the segregation of the diploids in this F_1 will throw light on the origin of the grey poplar.

The possible practical value of these triploid poplars is indicated. It may be possible to create tetraploid forms by crossing the triploids with normal diploids.

2469 PERRY, T. O.

The genetics of the photoperiodic response in poplar tree species.

Genetics 1953 : 38 : 681-82. (Abst.).

When grown under uniform environmental conditions ecotypes of *Populus* spp. exhibit

considerable diversity in the date of cessation of terminal growth. This diversity is correlated with the various latitudes and frost-free seasons within the range of the species. Hybridization between ecotypes and the results of artificial alteration of the photoperiod reveal that the duration of terminal growth is determined by the interaction of genotype and photoperiod. Evolutionary pressures have thus acted through photoperiod as the dominant agent for controlling duration of growth and onset of frost resistance. The possibility of successful acclimatization in new environments is usually severely restricted by this mode of control of the duration of growth and onset of frost resistance.

2470 IVANNIKOV, S. P.

(A quick-growing, rot-resistant aspen form).

Les. Hoz. (Forestry) 1952 : No. 12 : 37-38. [Russian].

A male aspen clone from the Obojansk forest, Kursk province, is briefly described. It is interesting for its vigour, good quality wood and resistance to rot.

2471 SCHMIDLE, A.

Zur Kenntnis der Biologie und der Pathogenität von *Dothichiza populea* Sacc. et Briard, dem Erreger eines Rindenbrandes der Pappel. (On the biology and pathogenicity of *D. populea* Sacc. et Briard, the causal agent of a bark canker of the poplar). Phytopath. Z. 1953 : 21 : 189-209.

Having briefly examined existing evidence from various records and experiments on the resistance of certain interspecific poplar hybrids to *D. populea*, the writer records from his own observations the high susceptibility of *P. deltoides* and *P. robusta* and the much lower incidence of infection in *P. canescens*.

2472 NIELSEN, P. C. & SCHAFFALITZKY DE MUCKADELI, M.

Flower observations and controlled pollinations in *Fagus*.

Z. Forstgen. Forstpflanzenz. 1954 : 3 : 6-17.

Experiments to determine the degree of metandry in *F. sylvatica* were made. This species was shown to be largely self sterile, although some individual trees are self fertile to a limited degree. A number of parthenocarpic fruits were obtained.

Crosses between *F. sylvatica* and *F. orientalis* resulted in hybrids with number of lateral leaf

veins intermediate between those of the parents. Heterosis was not observed. Crosses of *F. grandifolia* with *F. sylvatica* and *F. orientalis* gave a small number of apparently sound nuts that failed to germinate.

2473 PRYOR, L. D.

Genetic control in *Eucalyptus* distribution.

Proc. Linn. Soc. NSW 1953 : 78 : 8-18.

Data are presented in support of the hypothesis that autogamous *Eucalyptus* species occupy distinctly different ecological situations and that species which grow extensively together are reproductively isolated.

2474 ZERPA, D. M. DE

Los cromosomas de *Melia azedarach*. (The chromosomes of *M. azedarach*).

Agron. trop., Venezuela 1953 : 2 : p. 257.

Study of the pollen mother cells showed the chromosomes to be small and uniform and that $n = 14$.

2475 PRYOR, L. D.

Anther shape in *Eucalyptus* genetics and systematics.

Proc. Linn. Soc. NSW 1953 : 78 : 43-48.

Systematic units determined by anther shape do not correspond closely with either freely interbreeding or reproductively isolated species. Anther shape is inherited on a quantitative basis.

2476 PRYOR, L. D.

Variable resistance to eaf-eating insects in some eucalypts.

Proc. Linn. Soc. NSW 1952 : 77 : 364-68.

Progeny tests and morphological analyses of *Eucalyptus* hybrids indicate that in some species resistance to the leaf-eating scarab beetle is an independently inherited character.

2477 LITTLE, E. L. (JUN.)

A natural hybrid spruce in Alaska.

J. For. 1953 : 51 : 745-47.

A natural hybrid between members of two different sections of the genus *Picea*, *P. glauca* and *P. sitchensis*, is reported from the Kenai Peninsular, Alaska. The new hybrid, designated *P. x lutzii*, possesses leaves and cones intermediate in form between those of its parents.

2478 LI, H.-L.

New species and varieties in *Cephalotaxus*.

Lloydia 1953 : 16 : 162-64.

The new forms *C. hainanensis* and *C. fortunei* var. *alpina* are described.

2479 VABRE, A.

Structure du noyau quiescent de sept espèces de conifères. (Structure of the resting nucleus of seven species of conifers).

CR Acad. Sci., Paris 1954 : 238 : 382-84.

The resting nuclei of *Picea sitchensis*, *Pinus canariensis*, *Pseudolarix kaempferi*, *Tsuga heterophylla*, *Tsugo-Picea hookeriana* and *Widdringtonia dracomontana* were compared. Differences in the length and shape of the chromosomes were noted which may assist in elucidating certain phylogenetic questions and problems of classification.

2480 KNABEN, G.

En cytologisk analyse av diploid og triploid *Larix*. (A cytological analysis of diploid and triploid *Larix*).

Blyttia 1953 : 11 : 105-15.

Observations on chromosome morphology and synapsis in C. Syrach Larsen's triploid ($2n = 36$) *L. decidua* x *L. occidentalis* (cf. PBA, Vol. IX, Abst. 90) and in the two parent species are reported. The number of trivalents formed indicates a high degree of homology between the chromosomes of the parents. The hybrid probably arose from fertilization of an *L. decidua* egg cell ($n = 12$) by an unreduced male gamete of *L. occidentalis* ($2n = 24$).

The haploid number in two pollen cells of the hybrid proved to be $n = 17$ in one, and $n = 18$ in the other.

2481 HYUN, S. K.

Induction of polyploidy in pines by means of colchicine treatment.

Z. Forstgen. Forstpflanzenz. 1954 : 3 : 25-33.

The soaking of germinating seeds of *Pinus ponderosa* and x *P. attenuiradiata* in a colchicine solution gave tetraploid plants of the former species and mixoploid plants of both species. No polyploid plants were obtained from the treatment of ungerminated seeds, but weak concentrations of colchicine appeared to have a stimulating effect upon germination. Morphological changes observed in the polyploids included the thickening and shortening of the needles, which acquired a bluish tint; the rate of growth of the polyploids was the same as that of the diploid control plants. Some of the polyploids reverted to the diploid state during the first few months of growth.

2482 **Annual Report of the Department of Forestry, Union of South Africa, for the year ended 31st March, 1952 (1953) : Pp. 28.**

Chapter V of this report mentions that (1) the

chief cause of spiral grain in *Pinus longifolia* has been found to be hereditary in origin, and (2) controlled pollination of pines in the Natal Conservancy has been carried out.

2483 MACDONALD, J. A. B.

The place of *Pinus contorta* in British silviculture.

Forestry 1954 : 27 : 25-30.

The behaviour of *P. contorta* in provenance collections planted on various types of poor land in north Wales and in sites ranging from north Scotland to north-east England is described. Study of the collections has confirmed the existence of marked racial differentiation within this species. The author discusses the possible use of different types on the various kinds of poor moorland ground.

2484 INUKAI, T. & HAGA, R.

(Experimental ecological studies on the taste preferences of *Clethrionomys* for different kinds of larch).

Hokkaido Daigaku Nogakubu Hobun Kiyo/Mem. Fac. Agric. Hokkaido Univ. 1953 : 1 : 281-300. [Japanese].

The rodent *C. rufocanus bedfordiae*, a pest in the forests of Hokkaido, gnaws the bark of *Larix kaempferi* and *L. europaea*, but shows little interest in *L. dahurica*. The susceptibility of the first two species appears to be a consequence of the attractive qualities of their volatile oil.

VEGETABLES

2485 HARTMAIR, V.

Über die Grundlagen des alpinen Gemüsebaues. **(On the principles of vegetable cultivation under Alpine conditions).** Mitt. Versuchsanst. Wein- u. Obstb. Klosterneuburg Gartenb. Schönbrunn 1954 : 4 : Ser. B. : 1-15.

The question of selecting varieties suited to Alpine conditions is discussed and data on trials of cabbage and other vegetables cultivated at high altitudes in the Swiss Alps are presented. Early maturing and frost resistant types are preferable.

2486 EVDOKIMOV, M. M.

(The best standard varieties of vegetables for the RSFSR).

Sad i Ogorod (Gdn. & Veg. Gdn.) 1953 : No. 11 : 31-36. [Russian].

Brassica. Mention is made of the cabbages Zimnjaja Gribovskaja [Winter Gribovo] and Belorusskaja 085 [White Russian 085] and the cauliflower Otečestvennaja [Homeland], which

in recent trials have outyielded the previous standards.

Tomato. New varieties, developed at the Gribovo, Stalingrad, Vernehavskaja or Majak breeding stations, have outstripped in yield Bison 639 and Break o'Day 1638. Most of them are described as early, resistant to diseases and of determinate habit.

2487 BESSEY, P. M.

Improved vegetable varieties mean more for less!

Maine Fm Res. 1954 : 1 : No. 4 : 12-13.

Varieties of the following vegetables are discussed and recommended for cultivation in Maine: onion, musk melon, water melon, cucumber, tomato, snap bean, pea and sweet corn.

2488 IJIMA, T.

(Studies on vitamin B₁ content in respect of sexual differentiation in plants and in intervarietal hybrids).

Bull. Fac. Agric. Shinshu Univ. 1951 : 1 : 53-56. [Japanese].

A comparison of male and female plants of Japanese and American varieties of spinach and asparagus showed that female plants usually had a higher content of vitamin B₁ than convarietal male plants. In crosses involving Japanese and American varieties of egg plant and of maize, the content of vitamin B₁ in the F₁ hybrids was intermediate between those of the parent varieties.

2489 THOMAS, H. R. & ZAUMEYER, W. J.

Developing healthier vegetables.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 493-508.

Techniques used in breeding resistant varieties are described. An account of the results achieved in breeding for resistance to common diseases of the following crops is given: asparagus, bean and Lima bean, celery, cruciferous crops, cucumber, egg plant, lettuce, musk melon, onion and shallot, pea, red pepper, potato, spinach, squash and pumpkin, sweet potato, tomato and water melon. Resistant varieties are named.

2490 WALKER, J. C.

Disease resistance in the vegetable crops. II.

Bot. Rev. 1953 : 19 : 606-43.

A supplement is added to the article summarized in *PBA*, Vol. XII, Abst. 263. Progress which has taken place since then in developing disease-resistant varieties of the following crops is described: potato, sweet potato, pepper, onion,

cruciferous vegetables, spinach, lettuce, celery, cucurbits, tomato, egg plant, garden bean, Lima bean and garden pea.

- 2491 LAMM, R., TOMETORP, G. & ÅVALL, H.
Klassificerande sort- och stamförsök med köksväxter. (**Classifying variety and strain trials with vegetables, 1948-52**).

Medd. Trädgårdsförs. Malmö 1953 : No. 80 : Pp. 42.

LAMM, R., TOMETORP, G. & ÅVALL, H.
Sortförsök med köksväxter. (**Variety trials with vegetables**).

Försök o. Forskn. 1953 : 10 : 38-39.

Detailed results are recorded of the Swedish classifying trials of (a) varieties of marrowfat peas and lettuce; and (b) strains of white cabbage, musk melon, radish and spinach (cf. *PBA*, Vol. XXII, Abst. 1483).

- 2492 KLINKER, J. E. & EMMERT, E. M.
Kentucky vegetable recommendations, results of tests of many varieties.

Sth. Seedsman 1954 : 17 : No. 1 : p. 54B.

Varieties which have performed well with regard to yield, quality and drought resistance in tests at the Kentucky Agricultural Experiment Station are mentioned.

- 2493 **Planting for the winter supply of vegetables.**

N.Z. J. Agric. 1953 : 87 : 517-22.

Varieties of the following vegetables are recommended: silver and spinach beet, carrot, leek, cabbage, kale, cauliflower, broccoli, Brussels sprouts, spinach, lettuce, celery, tomato, bean and pea.

- 2494 BANGA, O.

Taproot-problems in the breeding of root vegetables.

Euphytica, Wageningen 1954 : 3 : 20-27.

Experiments on red garden beets have shown that in very young plants the growth activity of the primary axis, consisting of the leaf rosette and tap root, predominates; at later stages a changeable equilibrium exists between growth of the primary axis and the secondary activity of root thickening. The effects of temperature, soil moisture and other conditions upon this equilibrium are analysed, with reference to breeding problems.

- 2495 POUND, G. S.
Diseases of carrots.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 473-76.

Virginia Savoy and Old Dominion are resistant

to blight caused by cucumber mosaic. Resistance in Virginia Savoy depends on air temperature and the presence of a single dominant gene.

- 2496 OWNBEY, M. & MCCOLLUM, G. D.
Cytoplasmic inheritance and reciprocal amphiploidy in *Tragopogon*.
Amer. J. Bot. 1953 : 40 : 788-96.

Marked reciprocal differences in F_1 hybrids involving *T. pratensis* and *T. porrifolius* were observed with respect to ligule length and colour; reciprocal differences in fertility were also noted. No reciprocal differences were shown in the cross *T. porrifolius* x *T. dubius*. In the F_1 of *T. pratensis* ♀ x *T. dubius* ♂ all the progeny were short-liguled. The reciprocal was not obtained, but long-liguled putative F_1 hybrids were found in the field, as were long- and short-liguled races of *T. miscellus* (amphidiploid *T. dubius* x *T. pratensis*). No reciprocal differences in ligule length were observed in the cross of the long-liguled race of *T. miscellus* with *T. mirus* (amphidiploid *T. dubius* x *T. porrifolius*). When the short-liguled race of *T. miscellus* was used as female parent in crosses with *T. mirus*, F_1 plants with even shorter ligules were secured; plants obtained from the reciprocal included no hybrids. The possible evolutionary significance of cytoplasmic inheritance in the genus *Tragopogon* is briefly discussed.

- 2497 **Asgrow Y 51 onion.**

Your Crops, Assoc. Seed Grow. 1953 : 1 : No. 8 : p. 4.

This early maturing hybrid is recommended for the North and West of the USA. The bulbs are large, mild and sweet.

- 2498 KONONKOV, P. F.

(**New facts on the formation of cells from substances having no cellular structure**).

Dokl. Akad. Nauk SSSR (CR. Acad. Sci. USSR) 1953 : 90 : 887-88. [Russian].

Previous cytological observations on aerial bulbils in onions (cf. *PBA*, Vol. XXIV Abst. 686) have been extended to include evidence, obtained by staining methods, on the formation of cells from living substance having no cellular structure.

- 2499 WALKER, J. C.

Hazards to onions in many areas.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 431-35.

Mention is made of American varieties resistant to *Urocystis cepulae*, *Peronospora destructor*, *Botrytis allii* and *Pyrenochaeta terrestris*.

- 2500 KURITA, M.
(The caryotype of *Allium scorodoprasum* var. *viviparum*).
Senshokutai (Chromosome)/Kromosomo 1951 : No. 11 : 407-09. [Japanese].
A description of the chromosome morphology of the above form is given; there are $2n = 16$ chromosomes.
- 2501 YUASA, A.
(Amitosis in pollen mother cells of *Allium fistulosum*).
Senshokutai (Chromosome)/Kromosomo 1950 : No. 7 : 303-04. [Japanese].
Figures and a brief description are given of a case of amitotic cell division noted in the anthers of the above species.
- 2502 KATAYAMA, Y.
(Meiosis in the Yagura onion).
Senshokutai (Chromosome)/Kromosomo 1952 : Nos. 12-13 : 444-45. [Japanese].
Meiosis in *Allium fistulosum* var. *viviparum* 'Yagura' is described and illustrated; eight bivalents are usually formed and a fragment was noted in some instances.
- 2503 SNEEP, J.
The significance of andromonoecism for the breeding of *Asparagus officinalis* L. II.
Euphytica, Wageningen 1953 : 2 : 224-28.
The difficulties of producing nonandromonecious MM plants from andromonecious MM stock plants are discussed. Nonandromonecious MM plants can be used to produce commercial male seed but at present there is a danger of andromoney being transmitted to the commercial material.
- 2504 MIZUSHIMA, U. & KATSUO, K.
On the fertility of artificial amphidiploid between *Brassica nigra* Koch and *B. oleracea* L.
Tohoku J. agric. Res. 1953 : 4 : 1-14.
In an earlier paper (cf. PBA, Vol. XXI, Abst. 1932) the senior author described the colchicine-induced amphidiploid (BBCC) between *B. nigra* (BB) and *B. oleracea* (CC). This amphidiploid is genomically equivalent to the natural species *B. carinata* ($n = 17$) but, like its parents and unlike this natural species, the amphidiploid is self incompatible. The amphidiploid and its parents are also sterile in sib matings. Out of nine plants of the amphidiploid allowed to open-pollinate, only one set seed (40%). The progeny of this plant exhibited 3-69% self fertility; from this progeny three individuals with high (69%), medium (35%) and low (16%) self fertility were chosen. During successive generations, their progenies segregated for degree of self fertility, as did the progenies from crosses of the three selections with *B. carinata*. The results of meiotic investigations suggested that the variability in the self fertility of successive generations of the three selections is due to the occurrence of structural interchanges between the partially homologous B and C genomes, such alteration resulting in non-functional or unbalanced gametes. Whether a digenomic amphidiploid is self incompatible or self compatible depends, it is postulated, upon the constitution of the genotype of the original F_1 interspecific hybrid with respect to oppositional S and sympathetic T alleles, in accordance with the hypothesis of Kakizaki (cf. PBA, Vol. I, Abst. 136).
- 2505 SINOHARA, S.
(Studies on varietal degeneration in the cabbage. I.).
Ikushugaku Zasshi/Jap. J. Breeding 1952 : 2 : 1-6. [Japanese].
Experiments over a three-year period showed that the tendency towards premature or late bolting in the variety Fujiwasei [Fuji Early] was heritable. The significance of this finding for cabbage seed production is discussed.
- 2506 MIZUSHIMA, U. & KATSUO, K.
(A new case of the phenomenon of incompatibility in the cabbage).
Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 121-25. [Japanese].
Three self-incompatible groups, A, B and C, were detected in *Brassica oleracea* 'Summer'. A and C were cross fertile, B and C cross sterile, A ♀ and B ♂ cross sterile and A ♂ and B ♀ cross fertile. From these relationships and the compatibility relations of the few offspring obtained from selfing, the best explanation that the authors have been able to devise to account for the compatibility relations is a scheme involving tetraploid oppositional factors, in which A has the genetic constitution $S_{p1}S_{p2}S_{q1}S_{q2}$, B, $S_{p1}S_{p1}S_{q1}S_{q3}$, and C, $S_{p1}S_{p3}S_{q1}S_{q3}$.
- 2507 IWAMA, S., HAMASHIMA, N. & SERIZAWA, M.
(Altitude and the ecology of vegetables. I. The ecology of spring-sown cabbage with reference to seasonal high temperature).
Engeigaku Kai Zasshi/J. Hort. Soc. Japan 1953 : 21 : 241-50. [Japanese].
A series of varieties was grown at three different altitudes in the Nagano prefecture in 1948-50.

Varietal differences were noted in the capacity of the cabbage to mature under the excessively high summer temperatures of the lower altitudes.

- 2508 SNEEP, J.
Practijkproeven met spitskool 1949-1950 en 1950-1951. (**Trials of cabbage of the pointed-head type, 1949-1950 and 1950-1951**).

Meded. Inst. Vered. TuinbGewass. 1953 : No. 51 : Pp. 15.

The results of trials of 13 foreign varieties at 3 centres in the Netherlands are given, together with data on yield, maturity, quality, freedom from bursting, and suitability for cultivation in the Netherlands.

- 2509 VAN ROON, E. & KUIZENGA, J.
Enkele ervaringen met de teelt van sluitkoolzaad. (**Some experiences with the cultivation of cabbage seed**).

Landbouwwoorlichting 1954 : 11 : 174-79.

Agronomic factors of importance in the cultivation of cabbage for seed purposes are considered and the proportion of bolters developed at different times of sowing are given for six of the more important varieties grown in the Netherlands.

- 2510 WALKER, J. C.
Cauliflower, cabbage and others.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 425-30.

The basis of disease resistance in cabbages to *Fusarium oxysporum* f. *conglutinans* is discussed and resistant varieties are mentioned.

- 2511 WALKER, J. C., LARSON, R. H. & POUND, G. S.

Badger Market, a new disease resistant cabbage.

Phytopathology 1953 : 43 : 649-50.

A further account of Badger Market and its resistance to yellows and mosaic is given (cf. *PBA*, Vol. XXIV, Abst. 161).

- 2512 IWAMA, S., HAMASHIMA, N. & MOTAI, M.
(**Altitude and the ecology of vegetables. VI. On the ecology of spring-sown cauliflowers**).

Engeigaku Kai Zasshi/J. hort. Ass. Japan 1953 : 22 : 167-71. [Japanese].

Seven Japanese and introduced varieties were compared for adaptability to high altitudes in Japan. Early varieties proved most satisfactory.

- 2513 ANSTEY, T. H.

Self-incompatibility in green sprouting broccoli (*Brassica oleracea* L. var. *italica* Plenck). I. Its occurrence and possible use in a breeding program.

Canad. J. agric. Sci. 1954 : 34 : 59-64.

In a random population of 175 plants, 51.8% were self-incompatible and 29.6% self-compatible; the remainder were intermediate with respect to self-incompatibility. Populations from selfed seed obtained by bud pollination of eight unrelated self-incompatible plants were each grown in an isolation block, and also in a single crossing block together with the other seven populations. Six of the selfed lines were nearly or completely sib incompatible, producing on the average 0.46 seeds per silique, whereas in the crossing block they yielded 7.32 seeds per silique. For the production of F_1 hybrid seed, therefore, self-incompatible, cross-compatible lines grown in close proximity may be used. Top-cross populations from seven self-incompatible lines inbred for two to four generations gave on the average a 24.2% higher yield per acre than the commercial control, Waltham 29. The male top-cross parents consisted of two plants selected from a polycross population with desirable plant characteristics.

- 2514 VREEKEN, C. N.

Le chou de Bruxelles rouge "Rubine". (**Rubine, a red Brussels sprout**).

Bull. Hort., Liège 1954 : 9 : 76-77.

This new, red-leaved variety of Brussels sprout was obtained at Dordrecht, Belgium, by selection from among the progeny of a chance mutant.

- 2515 STINO [ISTINU], K. R. & EL-SHEHEDI, A. A.

Cytogenetic studies on *Portulaca oleracea* L.

Bull. Fac. Agric. Egypt. Univ. 1952 (1953) : No. 17 : Pp. 23.

Cytogenetical investigations were carried out on the weed type Baladi [Local] and the cultivated form Rumi [European] found in Egypt. Both were found to have $2n = 54$ chromosomes, and are believed to be hexaploids. Some univalents and multivalents were observed in both types and their hybrid. Baladi and Rumi crossed readily, giving fertile hybrids. Growth habit apparently depended on a single pair of genes, the erect habit of Rumi being incompletely dominant over the procumbent habit of Baladi. Type of seed coat was determined by three duplicate genes, the rough granulated seed coat of Rumi being completely dominant over

the smooth and wavy seed coat of Baladi. The quantitatively governed characters of leaf length, leaf width and stem thickness showed transgressive segregation in the F_2 .

- 2516 WHITAKER, T. W. & BOHN, G. W.
The striate-vein character in lettuce.
J. Hered. 1953 : 44 : 177-80.

Mutant striate-veined plants from a cross between Imperial A and Best Summer had fewer cross veins, 5-6 less leaves per plant and a stem 10-11 mm. shorter than Imperial 615. Crosses between the mutant and Imperial 615 showed that the striate-vein character (*st*) was monogenic and was inherited independently of achene colour.

- 2517 BOHN, G. W.
The important diseases of lettuce.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 417-25.

Varieties resistant to some races of *Bremia lactucae*, and to *Chlorogenus callistephi*, brown blight and tipburn are cited.

- 2518 NEWHALL, A. G.
Blights and other ills of celery.
Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 408-17.

The breeding of celery varieties resistant to blight and yellows is described. Varieties resistant to these diseases, to *Cephalosporium apii* and to stem check are given.

- 2519 POPE, D. T.
Heredity and nutrition in relation to magnesium-deficiency chlorosis in celery.

J. Elisha Mitchell sci. Soc. 1953 : 69 : p. 86. (Abst.).

Intervarietal differences in chlorosis due to magnesium deficiency were found. A cross between a normal plant and one showing such chlorosis, and the reciprocal, gave rise to only normal plants in the F_1 ; in the F_2 normal and chlorotic plants segregated in a 3 : 1 ratio.

- 2520 CAREW, J.
Seventeen years of celery breeding.
Market Gr. J. 1950 : 79 : No. 4 : p. 8.

A short history of celery breeding in the last two decades is given, special emphasis being placed on breeding for resistance to *Cercospora* and *Septoria*.

- 2521 ELLIS, D. E.
Cucurbit diseases in North Carolina and their control.

Bull. NC agric. Exp. Sta. 1953 : No. 380 : Pp. 11.

Cucumber, cantaloupe and water-melon varieties resistant to *Pseudoperonospora cubensis*,

Mycosphaerella melonis, *Cladosporium cucumerinum*, *Erysiphe cichoracearum*, *Colletotrichum lagenarium*, *Fusarium* wilt and mosaic are named.

- 2522 MUNGER, H. M.
Delicious 51, an early *Fusarium*-resistant muskmelon.

Fm Res. 1954 : 20 : No. 1 : p. 8.

The wilt-resistant musk melon Delicious 51 was developed at Cornell University Agricultural Experiment Station, Ithaca, NY, by crossing the resistant variety Iroquois with Delicious and by repeatedly back-crossing resistant plants to Delicious, followed by selection, after the fourth back cross, for uniformity in *Fusarium* resistance. Injection of inoculum into the stems of young plants was found to be a rapid method of eliminating susceptible individuals, in either the field or greenhouse. Delicious 51 is essentially similar in type to the original strain and is earlier maturing than Iroquois. Some of the muskiness of the latter variety has been purposely introduced into Delicious 51.

- 2523 NEUMANN, D.
Die Blühverhältnisse und der Frucht- und Samenansatz beim Ölkürbis (*Cucurbita pepo* L.) nach natürlicher und künstlicher Bestäubung. [Flowering relationships and fruit and seed set in the oil pumpkin (*C. pepo* L.) after natural and artificial pollinations].
Kühn-Archiv 1953 : 67 : p. 401.

A fuller version of this article has already been summarized in *PBA*, Vol. XXIII, Abst. 1548.

- 2524 WEILING, F.
Beobachtungen an Kürbisartbastarden. (Observations on interspecific hybrids of pumpkins).

Ber. dtsch. bot. Ges. 1953 : 66 : 368-77.

In research on interspecific hybridization of *Curcubita maxima*, *C. pepo*, *C. ficifolia*, and *C. moschata* (cf. *PBA*, Vol. XXI, Abst. 3087), the author raised F_3 plants from *C. maxima* x *C. pepo* from back crosses of the F_1 and F_2 hybrids to the parent species, especially *C. maxima*. Seedlings from the reciprocal cross could not be reared. The specific characters segregated in the F_2 , which exhibited the multiplicity of forms characteristic of interspecific hybrids. The F_1 and most of the F_2 plants were pollen sterile to a high degree.

Various characteristics of the fruit stalk and floral organs are described, with comments on their behaviour in the hybrid generations.

The aberrations noted in the ratio of ♂ to ♀ flowers exhibited segregation in the F_3 ,

apparently owing to genetic and not cytoplasmic causes.

Morphological anomalies recorded in the F_2 and F_3 included some that were new.

2525 PEARSON, H. M. & PEARSON, O. H.

Dimorphism in *Cucurbita moschata*.
Genetics 1953 : 38 : p. 681. (Abst.).

The variety Butternut is a variant of Canada Winter Crookneck. Dimorphic plants of Butternut have been observed, bearing both short-necked fruits of the Butternut type and long-necked fruits of the Crookneck type. Some tip cuttings from dimorphic plants have shown a similar reversion to the latter type. The F_1 's of Long x Long reverted types contain only a low percentage of the Butternut type. In one out of the four approach grafts made between the horticultural varieties Butternut (scion) and Crookneck (stock), the scion exhibited dimorphism. These phenomena are suggestive of an unstable genetic complex.

2526 KURITA, M.

(Chromosome numbers of two varieties of *Lagenaria*).

Senshokutai (Chromosome)/Kromosomo 1950 : No. 7 : p. 300. [Japanese].

Vars. *cougarda* and *turbinata* of *L. leucantha* both have $2n = 22$ chromosomes in the cells of the root tip.

2527 SINGH, R. N.

Studies in the sex expression, sex ratio and floral abnormalities in the genus *Trichosanthes* Linn.

Indian J. Hort. 1953 : 10 : 98-106.

T. cucumerina and varieties of *T. anguina* were invariably monocious, male flowers predominating. The ratio of ♂:♀ flowers in *T. anguina* ranged from 25.25:1 to 225.23:1; in *T. cucumerina* the ratio was 29.32:1. Hybrids between these two species showed ratios intermediate between the parental ones. *T. dioica* was typically diecious. Occasional ♀ flowers in *T. anguina* and *T. dioica* were functionless.

2528 CARLSSON, G.

Försök med hybridfrö av växthusgurka.
(Experiments with hybrid seed of the greenhouse cucumber).

Medd. Gullåk. VäxtförädlAnst. 1952 : No. 9-10 : 213-18.

A brief account of research at the Gullåker Plant Breeding Institute, Sweden, on the breeding of hybrid seed for the market is given. In cucumber crosses, differences in reciprocal combinations were noted. The best F_1 combination, called Hammenhög F_1 , has proved earlier

than Butchers, which it also surpassed in average yield by 20%. The hybrid averaged 5% more in yield than Hunderup, the only variety of the three that produced bitter fruits on occasion.

2529 BARHAM, W. S.

The inheritance of a bitter principle in cucumbers.

J. Elisha Mitchell sci. Soc. 1953 : 69 : 83-84. (Abst.).

The bitter taste of fruits of the downy and powdery-mildew resistant introduction PEI 173889 depends upon a single dominant gene.

2530 MIDDLETON, J. T. & BOHN, G. W.

Cucumbers, melons, squash.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 483-93.

Resistance to *Cladosporium cucumerinum* occurs in the cucumber varieties Maine 2, SR 6 and Highmoor; to *Pseudoperonospora cubensis* and aphids in the cantaloupe varieties Texas Resistant 1 and Georgia 47; and to *Erysiphe cichoracearum* in Georgia 47, and Powdery Mildew Resistant Cantaloupe 5, 6 and 7. Cucumber varieties MR 17, New York (Cornell), Early Surecrop Hybrid and Burpee Hybrid are resistant to cucumber mosaic. The V-1 and SR 91 cantaloupes are resistant to injury by sulphur.

2531 WARE, L. M., ISBELL, C. L., HARRIS, H. & JOHNSON, W. A.

Studies with pickling cucumbers in Alabama.

Circ. Ala. agric. Exp. Sta. 1953 : No. 114 : Pp. 29.

After trials and brining tests, Earliest of All, Model and Packer were considered the best varieties for pickling purposes.

2532 Chesapeake tomato.

Your Crops, Assoc. Seed Grow. 1953 : 1 : No. 8 : p. 4.

A further account is given of the variety Chesapeake, described in Abst. 735.

2533 MUNGER, H. M. & YORK, Y. L.

The Valnorth tomato.

Fm Res. 1954 : 20 : No. 1 : p. 9.

Valnorth, developed at Cornell University Agricultural Experiment Station, Ithaca, NY, was bred by crossing the early variety Farthest North and Valiant, followed by selection for earliness and back-crossing three times to the latter variety. Except for its earlier maturity and smaller fruit size, Valnorth closely resembles Valiant in appearance; it has consistently given higher early yields than this parent.

2534 GLASCHKE, B.

Betrachtungen zum deutschen Tomaten-sortiment. (**Observations on the German tomato assortment**).

Saatgutwirtschaft 1954 : 6 : 6-8.

Morphological data and details of yield are given for a number of varieties. One of the most important aims in breeding is early maturity, but this feature, together with other valuable characteristics, may be lost if the strain is not kept pure by rigorous selection. Other breeding objectives are resistance to disease and freedom from cracking.

2535 LESLEY, J. W. & LESLEY, M. M.

Fruitfulness, fertility and parthenocarp in tetraploid species hybrids of *Lycopersicon*.

J. Hered. 1953 : 44 : 261-64.

A tetraploid from *L. esculentum* x *L. peruvianum* was highly sterile, but almost wholly parthenocarpic and highly fruitful. Increased parthenocarp also occurred in diploids from another interspecific cross, *L. esculentum* x *L. hirsutum*, and thus was not necessarily associated with tetraploidy. Only one of the BC₁ plants was at all fruitful; it was selfed for three generations before further back-crossing. One BC₂ individual was more fruitful and fertile than a 4n plant of Pearl Harbour. Increased fruitfulness and fertility were not associated with increased chromosome pairing. It is postulated that the parthenocarp of the tetraploid hybrid was associated with an exceptional combination of genes from both species, causing excessive auxin production.

2536 REINHOLD, J. & GOETSCH, W.

Eine spontane Abänderung an den Früchten eines Fruchtstandes der Tomatensorte "Vetomold." (**A spontaneous change in the fruits of a truss of the tomato variety Vetomold**).

Arch. Gartenb. 1953 : 1 : 480-81.

The occurrence, at the Horticultural Institute of the University of Berlin, of dark green stripes on the light green background of the fruits of a single unripe truss of one plant of the variety Vetomold is attributed to mutation. No progeny were obtained from the seed of the aberrant fruits.

2537 FAÏNBRON, V. D.

(The inheritance of characters obtained by grafting in tomatoes).

Trud. Inst. Genet. (Proc. Inst. Genet.) 1953 : No. 20 : 210-24. [Russian].

Morphological changes in the first to fifth generations of the vegetative hybrid Albino on

Aphiachette, observed at Gorki Leninskie, are described. The seed progenies from the scion gave some segregates with the leaf or fruit characters of the stock and similarly those from the stock gave some segregates of the scion type. Some seed progenies had leaves or fruits differing from both the stock and scion varieties. In some cases changes did not occur until later generations. It was found that vegetative hybrids with dominant characters might give progeny with recessive characters and those with recessive characters a progeny with dominant characters. For instance, material with potato-shaped leaves gave segregates with dissected leaves; plants bearing white or yellow fruits gave a progeny with red or mauve fruits; and plants with oblong plum-shaped fruits gave segregates with round fruits.

2538 ROMANOVICH, E. A.

(A new method of vegetative hybridization of plants).

Priroda (Nature) 1953 : No. 12 : 103-04. [Russian].

A small-fruited tomato, injected with the cell juice of *Solanum dulcamara*, gave an F₁ with paler flowers, larger fruits and a low vitamin C content. Some fruits had a flattened shape. The skin of the F₁ fruits had a different anatomical structure from that of the initial tomato variety. No morphological changes, apart from some malformed flowers, occurred in the F₀.

2539 LEWIS, D.

The rogue tomato: a problem in nuclear, cytoplasmic and environmental control.

Heredity 1953 : 7 : 337-59.

Rogue plants occurred in proportions ranging from 0.1 to 20%, according to the pure line used. A high temperature for the whole of the germination period increased the frequency of rogues from 1.4% at 13° to 13% at 25-30° C. This increase could be attributed to the transformation of potentially normal seeds into rogue seeds. Half-rogues were produced as the result of heat treatments for 32 hours at 6-day intervals after sowing. Low intensity of light and short-day treatment during germination also increased the frequency of rogues. In addition, the position of the inflorescence from which seed was obtained affected the frequency of rogues, the first and second inflorescences giving a lower percentage than the third and fourth. The rogues and normal plants within a pure line behaved similarly when selfed: both produced approximately the same percentage of rogues. The difference between the rogues and normal plants within a line is therefore

phenotypic and not genetic. Crossing a rogue-producing line with a rogue-free one resulted in the suppression of the rogue character in the F_1 , F_2 , F_3 , and BC_1 to either parent. Rogues, however, appeared in the BC_2 to the rogue-producing line; as the female parents, plants of this line gave rise to approximately four times more rogues than when they constituted the male parents. The results are explained by postulating the presence of plasmagenes for the normal condition in the rogue-free line and their absence in the rogue-producing line; it is suggested that the reciprocal difference in the transmission of the rogue character is only expressed when the number of plasmagenes falls below a certain threshold value.

- 2540 TOMES, M. L. & QUACKENBUSH, F. W.
Two factor interaction governing beta-carotene content in the tomato.
 Genetics 1953 : 38 : 696-97. (Abst.).

The gene *B* conditions the formation of high concentrations of β -carotene (cf. *PBA*, Vol. XXIII, Abst. 3070). This gene is dominant but is inhibited in the presence of another dominant gene, I^B , derived from Rutgers, a red-fruited tomato with high lycopene content. Preliminary data indicate that red strains lacking I^B produce slightly more β -carotene than types such as Rutgers.

- 2541 HASKELL, G.
Influence of position of truss on pleiocotyly in tomato.
 Nature, Lond. 1954 : 173 : p. 311.

Truss position, a factor involved in the expression of the rogue condition, was found to affect the manifestation of pleiocotyly in the offspring, but rogues, which are cytoplasmically determined, and pleiocotyledonous plants were not associated; the latter, however, produced twice as many rogues as normal individuals. The proportions of pleiocotyledonous seedlings also increased in the progeny of reciprocal crosses between rogue and normal parents. Although not primarily responsible, cytoplasmic effects do, however, appear to play some part in the occurrence of pleiocotyly. It is suggested that dicotyly is a condition partly due to a balance between chromosomes and cytoplasm: when this balance is disturbed the threshold for dicotyly is broken down and pleiocotyly results.

- 2542 BORCHERS, E. A. & BARHAM, W. S.
The inheritance of an undesirable flavour in tomatoes.
 J. Elisha Mitchell sci. Soc. 1953 : 69 : p. 84. (Abst.).

The undesirable flavour of a line obtained from

Puerto Rico is heritable. Classification of populations on the basis of undesirable flavour was accomplished by adding Mayer's reagent to the filtered juice from individual plants; the amount of the compound responsible for the flavour was indicated by the precipitate formed and was measured in a spectrophotometer.

- 2543 ALEXANDER, L. J. & HOOVER, M. M.
Progress report of National Screening Committee for Disease Resistance in the Tomato for 1952.
 Plant Dis. Repr. 1953 : 37 : 317-24. (Mimeographed).

The report summarizes the results from tests of the reaction of accessions of *Lycopersicon* species and interspecific hybrids involving *L. esculentum* to the following: *Alternaria solani*, *Colletotrichum phomoides*, bacterial wilt, *Cladosporium fulvum*, cracking, *Fusarium* wilt, nematodes, *Phoma destructiva*, *Phytophthora infestans*, *Septoria lycopersici*, *Stemphylium solani* and the tobacco etch and mosaic viruses. Valuable sources of resistance have been discovered. Using the embryo culture technique, accessions of *L. peruvianum* are to be crossed with cultivated varieties on a large scale at the Ohio Agricultural Experiment Station.

- 2544 SCHEFFER, R. P. & WALKER, J. C.
Distribution and nature of Fusarium resistance in the tomato plant.
 Phytopathology 1954 : 44 : 94-101.

Cuttings were inoculated by allowing the transpiration pull to take up suspensions of bud cells of *Fusarium oxysporum* f. *lycopersici*. Susceptible and resistant varieties fell into the same classes of reaction when inoculated by this technique and the standard root-dip procedure. The data indicated that resistance is not localized in the roots but also occurs in the stems. Inoculated cuttings of plants with type A resistance (cf. *PBA*, Vol. X, Abst. 903) developed typical symptoms when allowed to take up dilute alcoholic solutions. The possibility that resistance depends upon continuous metabolic activity is briefly discussed.

- 2545 DOOLITTLE, S. P.
Ways to combat disorders of tomatoes.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 454-62.
 American varieties resistant to *Fusarium* and *Verticillium* wilts are mentioned.

2546 ALEXANDER, L. J.

Ohio W-R Brookston is new tomato variety developed by Station.

Fm Home Res. 1954 : No. 286 : p. 8.

This variety, developed by the Ohio Agricultural Experiment Station, yields well and has large, red fruits which set well in hot weather, are suited to processing and home gardens, and mature a few days earlier than Rutgers. It has wilt resistance from *Lycopersicon pimpinellifolium* and is tolerant of other diseases, especially tobacco mosaic and *Alternaria* leaf spot. Crosses are being attempted to obtain disease resistance from *L. peruvianum*.

2547 WITTWER, S. H.

The Michigan-Ohio hybrid: a new F₁ tomato for greenhouse production.
Quart. Bull. Mich. agric. Exp. Sta. 1953 : 36 : 191-94.

The hybrid was produced by crossing Michigan State Forcing with Ohio WR-3 Globe. The fruit sets heavily in dull weather; is red, firm, globular and uniform, though slightly smaller than Ohio WR-3 Globe fruit. The plant is large, vigorous and easily trained to a single stalk. Observations suggest high resistance to *Fusarium* wilt. It gives early yields equal to and total yields greater than its parents, and Spartan Hybrid and Vineland V 511.

2548 TOLBA, M. K. & SALEH, A. M.

Correlation between pH-value of tomato tissue and its susceptibility to attack by two *Fusaria*.

Nature, Lond. 1954 : 173 : p. 87.

At the Department of Botany, Cairo University, investigations on three tomato varieties have indicated that the pH value of the fruit tissue is correlated with the amount of rot produced by *Fusarium culmorum* and *F. oxysporum*, susceptibility decreasing with increased pH.

2549 BEST, R. J. & GALLUS, H. P. C.

Strains of tomato spotted-wilt virus.
Aust. J. Sci. 1953 : 15 : 212-14.

At the Waite Agricultural Research Institute, University of Adelaide, South Australia, six strains of the virus were differentiated. The reactions of *Lycopersicon esculentum*, *Nicotiana glutinosa* and *N. tabacum* to infection with the different strains are described.

2550 JOSHI, A. B. & HARDAS, M. W.

Chromosome number of *Abelmoschus tuberculatus* Pal et Singh—a species related to the cultivated *bhindi*.

Curr. Sci. 1953 : 22 : 384-85.

A. tuberculatus is closely related to the crop

plant *A. esculentus* and is almost immune to *Erica insulana* and mosaic. In *A. esculentus*, $2n = 130$, and in *A. tuberculatus*, $2n = 58$. Apparently viable seeds have been obtained from a colchicine-treated F₁ hybrid of *A. esculentus* and *A. tuberculatus* (cf. PBA, Vol. VI, Abst. 355 and Vol. XVI, p. 248).

2551 NICOLAISEN, N.

Unsere Gemüse-Hochzuchten. (Our pedigree varieties of vegetables).
Saatgutwirtschaft 1954 : 6 : 34-35.

Data on yield, quality and morphology are presented for a number of the more outstanding pea and bean varieties recently bred in Germany.

2552 ÅKERBERG, E. & JÖNSSON, A.

Svalöfssortimentet av ärter, vicker och åkerbönor. (The Svalöf collection of peas, vetches and field beans).
Allmänna Svenska Utsädesaktiebolaget, Svalöf 1953 : 11-15.

In reviewing the available Svalöf varieties of legumes, mention is made of the following: a new hybrid field pea 05801 (Hero x Artturi) which has yielded well in tests so far; the field pea Nola, which is earlier than Vesta and can be grown in Västerbotten and Norrbotten, thus extending pea cultivation northwards; Stjärnvicker [Star vetch] which will be ready for sale in 1954, and combines early maturity with high yield; and the late ripening horse bean line U 01, which is a selection from a commercial variety, and outyields by about 17% the Svalöf population previously on sale and has a 1000 seed weight 15% lower, an important point in sowing by machine and in reducing costs of sowing. Efforts will be made to breed an earlier ripening type with a still lower 1000 seed weight.

2553 WATANABE, H.

(On the influence of environmental factors on flowering and fruit setting in leguminous vegetables. III. The influence of temperature on the course of flowering in beans, and the influence of temperature and relative humidity on pollen germination).

Engeigaku Kai Zasshi/J. hort. Ass. Japan 1953 : 22 : 172-76. [Japanese].

The flowers were observed to open between midnight and sunrise. The pollen was most potent at or shortly before anthesis. Pollen germination occurred most readily at 94-100% relative humidity and at 20-25° C.

- 2554 ZAUMEYER, W. J. & THOMAS, H. R.
Field diseases of beans and lima beans.
 Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 393-400.

Varieties resistant to *Pseudomonas phaseolicola*, *Uromyces phaseoli* var. *typica*, common bean mosaic and curly top are cited.

- 2555 FIKRY, M. A. [FIKRI, M. 'A.] & LOTFY, T. [LOTFI, Th.]
Studies on the effect of colchicine and naphthalene acetic acid on seedlings of *Vicia faba* L.
 Proc. Egypt. Acad. Sci. 1952 : 8 : 88-113.

The effect of a wide range of concentrations of colchicine, naphthalene acetic acid and their combined effects on *V. faba* at different developmental stages were studied. Colchicine concentrations $0-1000 \times 10^{-6}$ mol./l. were used. Concentrations of 250×10^{-6} mol./l. and above retarded growth of the roots and caused tumours. C-mitosis was produced at concentrations of $200-250 \times 10^{-6}$ mol./l. and above. High concentrations of naphthalene acetic acid, $10^{-3}-10^{-5}$ mol./l., retarded growth, caused tumours and mitotic aberrations and increased cell division but no c-mitosis was produced. There was no additive effect when the colchicine and naphthalene acetic acid were used together. Colchicine concentrations over 250×10^{-6} mol./l. and high naphthalene acetic acid concentrations caused a decrease in fresh weight of the roots and an increase in dry weight, indicating that they had affected water absorption. No concentrations of either substance caused death and both had a greater effect in the earlier stages of development. Normal growth was resumed in all cases on transferring the seedlings to water, even after 27 days treatment.

- 2556 Veldbonen, 1954. (**Field beans, 1954**).
 Landbouwwoorlichting 11 : Bijl. 8; Ber. Rassenkeuze No. 160 : 1954 : unpaginated.

Data on maturity and morphological characteristics of seven varieties are presented and their comparative yields on different types of soil in the Netherlands tabulated.

- 2557 WAINSTEIN, P.
 Estudios comparativos sobre variedades de poroto. (**Comparative studies on varieties of bean**).
 Idia 1953 : No. 67 : 22-24.

Preliminary data are given concerning 32 out of a total of 120 varieties of *Phaseolus* under observation at the Mendoza experimental

station in Argentina. The majority were varieties of *Ph. vulgaris*, but *Ph. lunatus* and *Ph. coccineus* were represented too. Those found most promising for conditions of the Mendoza province were the climbing bean London Horticultural, the dwarf bean Idaho Refugee and the Lima bean Florida Butter.

- 2558 SINGH, D. & MEHTA, T. R.
Inheritance of lobed leaf margin in mung (*Phaseolus aureus* L.).
 Curr. Sci. 1953 : 22 : p. 348.

Crosses were made between a lobed-leaf type, 41 D-I, and the entire-leaf types T 1, T 48-6 and T 49-8. The difference in leaf type was found to be due to one pair of genes, lobed leaf (*e*) being recessive to entire leaf (*E*).

- 2559 BELIKOVA, N. L.
(Polyembryony in *Phaseolus*).
 Bjull. mosk. Obšč. Ispyt. Prirod. (Bull. Moscow Soc. Nat.) 1952 : 57 : No. 5 : 65-66. [Russian].

Observations on polyembryony in *Ph. vulgaris* are reported. In each instance, the embryo sac contained two diploid embryos, one resulting from the fertilization of the egg cell and the other, apparently from the fertilization of one of the synergids.

- 2560 WALKER, J.
Bean rust.
 Aust. Plant Dis. Recdr. 1954 : 6 : No. 1 : p. 6.

At the Hawkesbury Agricultural College, Richmond, NSW, rust has been recorded on the hitherto resistant variety Westralia (Kentucky Wonder x Prolific), suggesting the occurrence of a new race in addition to those previously detected, which, according to the American system of designation, consist of races 2, 17 and a variant of race 17.

- 2561 McKELVEY, J. J., SMITH, A. C., GUEVARA C., J. & CORTÉS L., A.
 Biología y control de los picudos del género *Apion* que atacan al frijol en México. (**Biology and control of the weevils of the genus *Apion* that attack the bean in Mexico**).
 Foll. téc. Secretaría Agric. Ganad., México 1951 : No. 8 : Pp. 42.

Varietal differences in attack by the pod weevil, *A. godmani*, were noted in studies of 24 varieties of *Phaseolus vulgaris*, those showing least attack in a number of successive years being Puebla 32, Hidalgo 6, Puebla 2 and Hidalgo 24.

- 2562 Landbouwstambonen, 1954. (**Agricultural haricot beans, 1954**).
Landbouwvoorlichting 11 : Bijl. 11 :
Ber. Rassenkeuze No. 163 : 1954 :
unpaginated.

Data on yield, disease and pest resistance and quality of beans are given for the varieties most widely grown in the Netherlands. In recent trials, Beka has proved the most productive variety.

- 2563 ALLARD, R. W.
New heat tolerant lima bean.
Calif. Agric. 1954 : 8 : No. 3 : p. 5.
Mackie, new heat-tolerant lima,
California release.

Sth. Seedsman 1954 : 17 : No. 1 : p. 73.
Mackie, released by the University of California, has been developed from a cross between a baby Lima bean strain and a strain similar to Burpee's Bush made in 1928. It is an upright bush-type variety and resembles Fordhook. Planting to cutting takes from 110-120 days. The seeds are white and as large as those of Ventura. The variety is sufficiently heat tolerant for the northern San Joaquin and Sacramento valleys. Reaction to pests and diseases is similar to that of Ventura and Fordhook. The difficulty of selecting for heat tolerance and bean size, both of which depend on many genes, is discussed.

- 2564 ALLARD, R. W.
Sources of root-knot nematode resistance in lima beans.
Phytopathology 1954 : 44 : 1-4.

From tests involving 380 varieties and strains of Lima bean, 12 were selected as suitable parental material for breeding for resistance to *Meloidogyne incognita* var. *acrita*. Resistance would appear to depend on many genes as all gradations from highly resistant to highly susceptible were found.

- 2565 MENEZES, O. B. DE
Cruzamento natural em guândo, *Cajanus indicus* Spreng. (**Natural crossing in cowpea, *C. indicus* Spreng.**).

Rev. Agric., S. Paulo 1953 : 38 : 281-84.
Alternate rows were sown with lines previously made pure for dark and light green pods respectively. The progeny of the seeds obtained from the light-green plants contained a number of plants with dark-green pods and their proportions showed the amount of natural out-pollination to be from 7 to 26%, with an average of 18%.

- 2566 **Leading soybean varieties.**
Soybean Dig. 1954 : 14 : 8-9, 34.

Descriptive notes on the chief varieties now

grown in the United States are given. A map showing the regions where cultivation of the different varieties is recommended is also provided.

- 2567 WEISS, M. G.
Registration of soybean varieties, IV.
Agron. J. 1953 : 45 : 570-71.

Descriptions of the varieties Perry (cf. *PBA*, Vol. XXII, Abst. 3079 and XXIV, Abst. 1523) and Ogden (cf. *PBA*, Vol. XIII, Abst. 1007), recently approved for registration in the United States, are given.

- 2568 WILLIAMS, L. F. & LYNCH, D. L.
Inheritance of a non-nodulating character in the soybean.
Agron. J. 1954 : 46 : 28-29.

A mutant having resistance to nodulation by *Rhizobium japonicum* occurred in BC₁S₄ selections from the cross Lincoln x (Lincoln x Richland) at the Missouri Agricultural Experiment Station. This character, for which the symbol *no* is suggested, was inherited as a single recessive.

- 2569 OINUMA, T.
(On an artificial tetraploid soya bean as a green crop).
Ikushugaku Zasshi/Jap. J. Breeding 1952 : 2 : 7-13. [Japanese].

A detailed morphological comparison between the normal diploid and a colchicine-induced autotetraploid strain of the variety Chasenseki is given. The tetraploid has larger leaves than the diploid but is not promising as a green manure except in as far as it has a better-developed root system with prolific bacterial nodules.

- 2570 HOWELL, R. W. & CARTTER, J. L.
Physiological factors affecting composition of soybeans. 1. Correlation of temperatures during certain portions of the pod filling stage with oil percentage in mature beans.
Agron. J. 1953 : 45 : 526-28.

Positive correlation between maximum temperature and oil content was found for group O varieties (Canadian) and group VIII (Southern USA), but minimum temperatures only affected group VIII. The correlation was greatest during the period of oil accumulation (cf. *PBA*, Vol. VIII, Abst. 1426).

- 2571 MATLOCK, R. S.
Dorman soybeans for Oklahoma.
Bull. Okla. agric. Exp. Sta. 1953 :
No. B-413 : Pp. 15.

From tests carried out in Oklahoma, the yield,

oil and protein content and other characteristics of this variety are described in detail (cf. *PBA*, Vol. XXIII, Abst. 778).

- 2572 JOHNSON, H. W. & CHAMBERLAIN, D. W.
Bacteria, fungi, and viruses on soybeans.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 238-47.

The diseases of soya beans caused by pathogens in the above groups are described. Breeding for resistance to some diseases has progressed, but the general results are not yet satisfactory.

- 2573 WEBER, C. R.
Clark, a new soybean for southern Iowa.

Iowa Fm Sci. 1954 : 8 : No. 8 : 6-8.

A further account is given of this variety (cf. Abst. 751). Results of varietal tests in Iowa, in which Clark gave the highest yield, are included.

- 2574 LAMPRECHT, H.
Bisher bekannte und neue Gene für die Morphologie der *Pisum*-Blüte. (**Previously known and new genes for the morphology of the flower of *Pisum***). Agri hort. genet., Landskrona 1953 : 11 : 122-32.

The seventeen interspecific and intraspecific genes in *Pisum* hitherto recognized as influencing the morphology of the flower are discussed briefly and the literature on the subject is reviewed. A recently discovered interspecific gene *sti*, which determines the shape of the inflorescence and flower, results in malformations when recessive. The new intraspecific gene *naf* causes aberrations in the keel when recessive.

- 2575 LAMPRECHT, H.
Further studies of the interchange between the chromosomes III and V of *Pisum*. Agri hort. genet., Landskrona 1953 : 11 : 141-48.

The introduction gives a survey of previous studies on gene interchange in *Pisum*. In the present experiments, line 379, which has the gene formula *Le a Z B D^{co} P Gp Fa* and an interchange between chromosomes III and V, was crossed with line 668, possessing the formula *Le A Z b D^w p gp fa*. Segregation ratios in the F₂ were studied. Strong linkage between *B* and *Gp*, from chromosomes III and V respectively, was found, the crossing-over value being $18.6 \pm 1.32\%$. Gene maps showing

the point at which breakage had occurred are given.

- 2576 HILLMANN, H. D.
Bestimmung von Erbsensorten im Keimlingsstadium. (**Determination of pea varieties in the seedling stage**). Saatgutwirtschaft 1954 : 6 : 13-14.

A method is described by which varieties may be distinguished by differences in the shape of the prophyll.

- 2577 MORRIS, G. P.
Investigations into the use of the first two leaves of pea seedlings in varietal identification.

J. nat. Inst. agric. Bot. 1953 : 6 : 489-93.

Experiments were carried out in 1953 to examine the possibility of using the phyllodes of seedling peas as aids to identification. A considerable range of characteristic differences both between types and varieties was found (cf. Abst. 2576).

- 2578 SPINA, S.
Osservazioni sulla biologia florale del pisello. (**Observations on the floral biology of the pea**). Riv. Ortoflorofruttic. ital. 1954 : 38 : 20-32.

Notes are presented on the systematics of the genus *Pisum* and on the influence of various factors on flowering and seed setting in some horticultural varieties. Experiments in which emasculated flowers were left without pollination gave no set of seed; when pollinated with other varieties and with *P. arvense*, good sets were obtained; regular Mendelian segregation was observed in the F₂ generations, including those from the crosses with *P. arvense*, which is therefore regarded as belonging to the species *P. sativum*. The opinion is expressed that plants displaying vegetative heterosis but with small pods and seeds of poor quality, often found in fields of garden peas, are ascribable to outpollination with field peas.

- 2579 TRÉBUCHET, G., CHOPINET, R. & DROUZY, J.
Contribution à l'étude des variétés de pois potager cultivées en France. (**Contribution to the study of garden pea varieties cultivated in France**). Ann. Inst. nat. Rech. agron., Paris 1953 : 3 : Sér. B. : 147-251.

Comprehensive data on morphological and physiological characteristics, including time to maturity, yield, quality and resistance to disease, are presented for the principal varieties cultivated in France.

2580 SCHROEDER, W. T.

Root rots, wilts, and blights of peas.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 401-08.

Virtually all modern American commercial pea varieties are resistant to *Fusarium oxysporum* f. *pisi* race 1. Delwich Commando is also resistant to race 2. Resistance to each race is determined by a single dominant gene.

2581 Ronde groene erwten, 1954. (Green peas, 1954).

Landbouwwoorlichting 11 : Bijl. 4; Ber. Rassenkeuze No. 156 : 1954 : unpaginated.

Data on yield, quality, and resistance to diseases and lodging are presented for eight varieties. In trials conducted on various types of soil throughout the Netherlands, Rondo CB gave the highest consistent yields, but was out-yielded by Vares on marine clay soils. Rondo CB, Stijfstro CB [Stiff Straw CB], Parel CB and CB 4218 are comparatively resistant to *Fusarium solani*; Vares is the only variety resistant to American vascular disease.

2582 MCCOLLOCH, L. P.

Postharvest virus diseases.

Plant Diseases. Yearb. Agric. US Dep. Agric. 1953 : 822-26.

American Wonder, Perfection, Cannors Gem, Dwarf White Sugar, Little Marvel, Wisconsin Early Sweet and Surprise are garden pea varieties resistant to common mosaic.

2583 NILSSON, F., ÅVALL, H. & HINTZE, S.
Sortförsök med konservärter 1949-1952.
(Variety trials with peas for processing, 1949-52).

Medd. Trädgårdsförs. Malmö 1953 : No. 79 : Pp. 32.

NILSSON, F., ÅVALL, H. & HINTZE, S.
Sortförsök med konservärter. (Variety trials with peas for processing).

Försök o. Forskn. 1953 : 10 : 37-38.

During 1949-52 trials were carried out at Alnarp, Sweden, and other places in the district where preserving peas are grown. The collection tested included some new Swedish and imported varieties from Canada and the USA. Yield, time of ripening and quality, e.g. flavour and hardness, as determined by the tenderometer or the texturemeter and by cooking and deep freezing tests, are recorded. Short descriptions of all the varieties tested are given.

The quality of Thomas Laxton and the new Swedish variety Hamund/48 proved excellent

in the fresh and frozen state; both are recommended for deep freezing. Hamund/48, only about two days later than Kelvedon Wonder, is a low growing, high yielding pea with pointed, smooth pods, containing 5-7 medium-sized seeds of high quality.

2584 SUETSUGU, I. & UEKI, C.

(The technique of crossing in *Astragalus sinicus*).

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 2 : 225-29. [Japanese].

The above species is protandrous. Emasculation is best effected by excising the stamens before anther dehiscence, or by killing the self pollen in 50% alcohol.

2585 Two new sweet corn inbreds.

Seed World 1954 : 74 : No. 3 : p. 46.

The Iowa Agricultural Experiment Station has released inbreds 5145 and 6038. The former was developed from (P 39 x 9) x P 39; its season is the same as that of P 39. It is non-tillering and six feet high. The ear is cylindrical with 16 rows and a deep, narrow kernel of medium yellow colour. It is moderately resistant to Stewart's disease. The hybrid 5145 x 453 is named Iosquaw and is equal to Iochief in yield. Inbred 6038 came from the cross (P 39 x WLYWsu) x P 39. It is nearly tillerless and has white interior silks but the plant characters are otherwise similar to those of P 39, whilst the season is four days later. It is fairly resistant to Stewart's disease and *Helminthosporium*. It combines well with C 7, 101de, LTB, 5125 and inbreds which combine with P 39.

2586 MEZZACAPPA, M. P.

Melhoramento do milho doce (*Zea mays saccharata* Stu.). [Breeding sweet corn (*Z. mays saccharata* Stu.)].

Ann. Esc. Agric. Queiroz 1952 : 9 : 309-24.

Genetical studies have indicated that more than 3 genes act as modifiers of the sugary gene *su*₁, and that some of them are linked with endosperm colour, so that selection for orange endosperm colour tends to increase the number of pseudosugary grains. Introduced sweet corns are unsuitable for cultivation in Brazil on account of photoperiodic and other effects; the most successful introduction was a hybrid between a sweet corn from the USA and a white flint corn from the Austrian Tyrol, and this line was crossed with two Brazilian maize varieties, and the selfed progeny from the crosses subjected to selection for several

generations. A number of the best lines selected were then intercrossed and various multiple crosses made; two of these, P-678 and P-18, were retained for multiplication on account of their good flavour, sweetness and fine texture of pericarp and endosperm. A number of the synthetics were selfed further and the combining ability of the inbred lines was tested in the S_3 by top-crossing, after which some 80 single-cross hybrids were produced from the combinations showing the highest specific combining ability. A further series of second-cycle synthetics is also being constituted.

In the attempt to produce an early-maturing form, P-18 was crossed with two introduced early varieties, Quarentão [Forty-day] and Colorado Estanzuela [Estanzuela Coloured] in 1945 and some good early-maturing selections with tender, sweet corn of orange-yellow colour are now available; these are being top-crossed with various lines in the hope of eliminating the tendency to produce pseudosugary grains referred to above.

Crosses have also been made with a number of dent corns with the object of producing good yellow sweet corns.

2587 **Shipping corns for the South.**

Your Crops, Assoc. Seed Grow. 1953 : 1 : No. 8 : p. 4.

In competitive trials with other varieties in the South, Calumet sweet corn was at or near the top and showed least damage by earworm. Huron sweet corn is recommended by the Mississippi Experiment Station.

2588 SACCO, T.

Sulle caratteristiche botaniche e biochimiche di due forme di *Mentha piperita* Huds. (f. *pallescens* et *rubescens* Camus) coltivate in Piemonte. [**On the botanical and biochemical characteristics of two forms of *M. piperita* Huds. (ff. *pallescens* and *rubescens* Camus) grown in Piedmont**].

Allionia, Torino 1952 : 1 : 209-17.

The above two forms are described and illustrated. Owing to its hardiness, high content of essential oil and its greater drought resistance f. *rubescens* is more widely grown in Italy than f. *pallescens*; but the latter is to be preferred for its higher menthol content and much lower content of menthone, a ketone which adversely affects oil quality.

2589 CARLSSON, G.

En ny persiljestam. Extra mosskrusig driv OJO/50. (**A new parsley strain. Extra mosskrusig driv OJO/50**).

Medd. Gullåk. VäxtförädlAnst. 1952 : No. 9-10 : 225-28.

The Gullåker Plant Breeding Institute is raising the above strain, which is intended for forcing in the greenhouse and has surpassed all others in trials at Hammenhög and Alnarp (cf. *PBA*, Vol. XXII, Abst. 792). It was bred by applying the method of paired crossing to the best plants from superior families selected from among families of Extra mosskrusig [Extra Moss-curled]. The leaves are dark green and the stalks firm.

BOOK REVIEWS

FRYER, H. C.

Elements of statistics.

Chapman & Hall, London and John Wiley & Sons, Inc., New York 1954 : 38s. : Pp. viii + 262 : figs. : tables.

This is a clearly-written elementary account of statistical methods. It does not contain anything that has not appeared in many standard works, and it is strictly limited in scope to basic essentials. For example, it does not go beyond the simpler t tests or regression and correlation calculations, nor does it deal at all comprehensively with the χ^2 test. Within its limitations, however, it is sound. There is no mathematics in the book, but explanations are given of mathematical concepts and distributions, with the aid of experimental sampling. A pleasing feature is the wealth of examples.

The book will be useful as a first introductory text for the student, and some references are given for further reading. The tables provided, though small, seem adequate for using the various tests described. There is a slip in the calculation of P on p. 141, and the drawing of diagrams could have been better, particularly that on p. 157.

J. W.

MUDRA, A.

Einführung in die Methodik der Feldversuche.

(**Introduction to the methods of field experimentation**).

S. Hirzel Verlag Leipzig 1952 : 17 figs. : 77 tables : Pp. x + 178.

This book is designed to help the experimentalist to carry out trials in the field involving the comparison of several varieties or treatments.

The exposition is nonmathematical and the instruction is by example. The chapters are 1, Practical problems, e.g. edge effects, size of plots and blocks, methods of sowing, preparation of the area, presentation of yields: 2, Types of design (Latin squares and rectangles, lattice, factorial and split-plot designs): 3, Statistical concepts (Population, sample, variance, normal distribution, t test, confidence intervals): 4, Analysis of experiments (Analysis of variance and covariance): 5, Analysis of lattices: 6, Analysis of factorial designs: 7, Series of experiments: 8, Graphical presentation. There is a collection of tables, (a) types of design for different numbers of treatments; (b) random selection of numbers 1–25; (c) squares and square roots; (d) the distribution of t ; (e), (f) percentage points of t and F . The book is self-contained for those interested in this special field and demands the minimum of prior statistical knowledge. Essentially a well-written “cook-book” it should be very useful to German readers. D. V. L.

YATES, F.

Sampling methods for censuses and surveys.

Charles Griffin & Co., Ltd., London 1953 : 2nd ed. : 38s. : Pp. xvi + 401 : tables.

This book has been much enlarged by the addition of two new chapters. The remainder is unaltered except for inserting references at appropriate points to the new material. The first extra chapter deals with the critical analysis of survey data, in particular with contrasts between domains, and the relative precision of different methods of sampling; on the methodology side, multiple regression analysis is given to supplement the simple regression analysis dealt with earlier in the book. Miscellaneous developments are described in the second extra chapter: modern machine methods of computation for census work, and various further methods of sampling. The sampling method used to obtain an early report on the 1951 Census of Great Britain is described.

J. W.

LYSENKO, T. D.

Agrobiology.

Foreign Languages Publishing House, Moscow 1954 : 4th ed. : 15s. : Pp. 636 : 56 figs. : tables.

Readers of these pages are familiar with T. D. Lysenko and his writings (cf. *PBA*, Vol. VI, p. 329, Vol. XVI, p. 365 and Vol. XVIII, Abst. 2000) but the present volume affords them an opportunity of reading *in extenso*, in an English translation, many of his original articles, which

were collected together in 1946 and published under the title *Agrobiologija* (cf. *PBA*, Vol. XVIII, p. 178). One section, on *Heredity and its variability*, has already appeared in an English translation by Professor Dobzhansky (cf. *PBA*, Vol. XVII, p. 348); this translation is on the whole closer to the original text and reads more like English than that of Dobzhansky, but is not entirely free from errors: for instance the rendering of адекватно by the English “adequate” gives no idea whatsoever of Lysenko’s basic idea of changing *in accordance with the particular* environmental conditions, for which he invariably employs this word.

Certain further works of the author which have appeared since 1946 have also been included and the bibliography of his works has been extended up to the year 1951.

It is interesting, and perhaps significant, that the frontispiece shows Lysenko holding an ear of branched *Triticum turgidum*, claimed by him and his school as a novelty but actually known to the early Egyptians, Sumerians and ancient Romans and referred to in the *Alimurgia* of Targioni in 1767 as having been sown by farmers who, hoping great wonders from it, were deluded, as it yielded no more than ordinary wheat.

HOLTUM, R. E.

Plant life in Malaya.

Longmans, Green & Co., London 1954 : 18s. : Pp. viii + 254 : 51 figs. : 1 plate.

This book was written mainly as an introduction to Malayan plants for residents in Malaya, teachers with little botanical training and students in their last school years and first university year. Plant habit and growth are briefly described, emphasis being laid on adaptation to environmental conditions. Six chapters on plant structure, using common Malayan plants as examples, include descriptions of the characteristics of monocotyledons and dicotyledons, monopodial and sympodial growth, natural and artificial vegetative propagation, flower structure, and fruit structure and dispersal. Bananas, orchids, grasses, epiphytic ferns, terrestrial ferns and plants adapted to a particular mode of life, i.e. climbing plants, parasites and saprophytes, water plants and plants in relation to ants, are dealt with in separate chapters. The book concludes with a brief account of the Malayan forest. Economic plants such as rice, rubber, pineapple, bamboo and ginger are described in the appropriate chapters. Detailed morphological structure is excellently illustrated by clear line diagrams but readers unfamiliar with the plants would

probably have found photographs an additional advantage.

LOOMIS, W. E.

Growth and differentiation in plants.

Iowa State College Press 1953 : \$7.50 :

Pp. viii + 458 : figs. : tables : plates.

This remarkably heterogeneous symposium consists of a series of papers, which set out to review various aspects of the physiology of growth. Several of the contributions, such as that by G. Baldovinos de la Pena on the Growth of the root tip, and by J. C. O'Kelley and P. W. Carr on the Elongation of the cotton fiber, consist principally of hitherto unpublished observations by the authors.

Among the more noteworthy and comprehensive of the reviews proper are the article by G. F. Sprague on Heterosis, a discussion of the Reactions of plants to photoperiod by A. W. Naylor, the article on Bioelectric fields and correlation in plants by H. F. Rosene and E. J. Lund, and the account of Some factors associated with diseased growth in plants by A. J. Riker and A. C. Hildebrandt. The straightforward description of Anatomical differentiation in shoot and root axes by K. Esau follows traditional lines. No general discussion of vernalization is included, only an account of vernalization in vegetables by H. C. Thompson.

There are two papers on hormones, one on the Physiology of hormone action by S. A. Gordon, dealing with general aspects, and another by J. Bonner and J. Liverman, ostensibly on Hormonal control of flower initiation, but dealing principally with the relationship between flower induction and photoperiod and overlapping considerably with the paper by A. W. Naylor.

The other papers are as follows: a short and rather featureless introduction to Plant Morphogenesis by E. W. Sinnott, a very elementary account of the mathematics of growth by R. E. Buchanan, an interesting review of Dormancy by N. C. Thornton, mainly confined to the work of W. Crocker and his students, a somewhat miscellaneous collection of observations on Growth correlation by the editor, a highly biochemical paper by H. S. McKee on the Structure and synthesis of protoplasm, which draws attention to the theories of W. D. Francis on the possible role of iron as an assembling agent in the primary formation of protoplasm, and a long account of Cellular differentiation: an experimental approach, by B. Commoner and M. L. Zucker, largely concerned with techniques. Any reader of the symposium will profit from the cross section of current physiological work that it presents. Had editorial control over

such matters as the scope and length of the articles been stricter, however, it should have been possible to produce a better balanced and more comprehensive survey within the same compass.

TÄCKHOLM, V. & DRAR, M.

Flora of Egypt. Vol. II. Angiospermae, part Monocotyledones : Cyperaceae-Juncaceae.

Fouad I University Press, Cairo : Bull. Fac. Sci. 1950 : No. 28 : Pp. xii + 547.

The first volume of the *Flora of Egypt* was published in 1941 and reviewed in *PBA*, Vol. XVI, p. 486. Volume II deals with further families of the monocotyledons, covering the Cyperaceae, Palmae, Araceae, Lemnaceae, Bromeliaceae, Commelinaceae, Pontederiaceae and Juncaceae. Like the first, this volume displays not only the expected botanical knowledge but also provides a wealth of information on the archeological connexions, linguistic background, history, and past and present economic uses of the major and minor economic species, with copious references to the literature on the various subjects. In this volume the section on *Cyperus papyrus*, now a comparatively rare plant in Egypt, is of absorbing general interest, and the comprehensive accounts of the date palm and *Colocasia antiquorum* should not be missed by those interested in the origin and history of crops. It is a pity that a flora of such excellence and wide range should continue to be bound with only paper covers; it is also to be regretted that the list of additions and corrections has not completely remedied the misprints.

Flore du Congo Belge et du Ruanda-Urundi. Spermatophytes. (Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes).

Institut National pour l'Étude Agronomique du Congo Belge, Bruxelles 1953 : 4 : 20 figs. : 18 plates.

The first three volumes of this important flora were reviewed in *PBA*, Vol. XXIII, p. 342. The present volume continues with the Leguminosae and includes tribes Sophoreae, Genisteae, Trifolieae and Loteae of the Papilionaceae.

MOLISCH, H. & HÖFLER, K.

Anatomie der Pflanze. (Plant anatomy).

VEB Gustav Fischer Verlag, Jena 1954 :

6th ed. : Pp. viii + 180 : 171 figs.

The last edition of this standard introduction to plant anatomy reviewed in *Plant Breeding Abstracts* was the fourth which came out in 1936 (cf. *PBA*, Vol. VII, p. 344); the first was issued

in 1920. The present edition has been revised by Professor Höfler, who collaborated with Professor Molisch in the production of the fourth edition and who was responsible for the fifth edition in 1945.

The general lay-out of the book has suffered little change during its thirty years of existence, in spite of the numerous revised and interpolated passages necessitated by subsequent research. As an elementary textbook on the subject, it can still be recommended as a clear and straightforward account. It should be borne in mind, however, that the book has definitely aged, and on certain topics, such as the distinction between living and lifeless cell contents, the concepts of morphological nature, metamorphosis and homology, the distinction between secretory and excretory structures, and the treatment of the endodermis as a root tissue only, exhales a faint mustiness and fails to provide a satisfactory introduction to the less formal modes of analysing these notions that now prevail.

GALE, E. F. & DAVIES, R. (Editors)
Adaptation in micro-organisms.
Third symposium of the Society for
General Microbiology held at the
Royal Institution, London, April 1953.
 Cambridge University Press 1953 : 30s. :
 Pp. viii + 339 : figs. : tables : plates.

A summary of the symposium held by the Society for General Microbiology in April 1953 has already been printed (cf. Abst. 84). The volume now published comprises the original invited contributions, taken as read at the symposium itself and merely summarized by the contributors, together with the written comments sent in by contributors to the discussion, in lieu of a verbatim record of the discussions. This method, as pointed out by the editors, has both advantages and disadvantages; many of the points failed to reach the editors at all, whereas some questions that went unanswered on the day appear now with "neat and concise replies, often including references to the literature." In this form the volume will provide stimulating reading for anyone interested in adaptation, one of the most pregnant problems of biology to-day. The volume is handsomely produced and printed, in the manner we have come to associate with the Cambridge University Press, and if it has one main defect it is the absence of any form of summing-up to balance the somewhat sketchy introductory contribution by R. Y. Stanier. This may, however, serve as an additional stimulus to the reader to study for himself the original contributions and equally valuable discussions with a degree of attention

that certainly was not possible for those of us who had the privilege of attending the original symposium.

LURIA, S. E.

General virology.

John Wiley & Sons, Inc., New York &
 Chapman & Hall, Ltd., London 1953 :
 68s. : Pp. xiii + 427 : 93 figs. : 32 tables.

When called upon in 1946 to give a course of instruction in virology, Professor Luria, who has himself contributed some of the most important researches in the field of virus research, decided to treat the subject not as a mere branch of pathology but as a biological science akin to bacteriology, say, or any of the giants like zoology or botany. The existing reference books were considered unsuitable as textbooks and Professor Luria decided to write one himself. The present volume is the result. Whether it is any more of a textbook than its predecessors is open to question; it is packed full of references to results published, often quite recently, in the literature, and thus bears more resemblance to the modern concept of "reviews" than to a textbook in the usual sense. Be that as it may, it makes fascinating reading. It starts with a historical review and then proceeds to describe the various virus types and their characteristic behaviour; bacteriophages, plant viruses and animal viruses are dealt with separately throughout the book. The earlier chapters deal with such subjects as classification, titration, visualization and purification of virus particles, their nature and their serological properties, and the effects of various environmental factors upon them. There follows a large section devoted to the bacteriophage-bacterium system, a subject on which the author is particularly competent to speak; this leads to similar analyses of the pathogen-host relationship in other virus groups and of the phenomena of interference and variation, mode of reproduction and origin and nature of viruses. Many questions remain unanswered but many others become much clarified by the discussions. Thus we are told that most viruses when introduced into the host tissue exhibit growth cycles characterized by an initial reduction (eclipse) of the infectious titre below the level of the inoculum, followed by a period in which virus titre remains low. The virus titre then increases and reaches a maximum after a time interval fairly characteristic for each virus; electron-microscope and light-microscope observations strongly suggest that the new virus particles represent the culmination of a process of stagewise maturation. These observations reveal no sign of binary fission of

the virus particles as such. The eclipse phenomenon is characteristic of all viruses whose growth cycle has been fully analysed; these include the bacteriophages but not, for the time being, the plant viruses, for which the data available are still very limited. It would therefore appear that upon invasion of the host tissue the infectious particle is so modified as to become unrecognizable as such. "Reproduction of noninfectious virus elements", we read, "takes place by mechanisms, the nature of which still escapes us but which are probably on a level with the reproduction of the specific, self-perpetuating elements of the host cell itself (chromosomes, mitochondria, plastids). The role of the pre-existing virus in inducing the formation of more virus is completely unknown. The cell may possess a diffuse nonspecific machinery for such syntheses, and the specific material of the infecting virus may introduce a new model for synthesis". Reproduction of noninfectious copies of the infecting virus may be followed by maturation, with production of infection particles. These seemingly cannot reproduce in the cell where they have arisen but must, at least according to the evidence from bacteriophages, again go through the invasion process before reproducing: they are thus envisaged as a sort of resting stage which carries the virus material from cell to cell and possibly protects it from injury.

This conception of virus reproduction would, of course, account for the peculiar phenomena of genetic recombination which have been fairly well substantiated in the bacteriophages but reported also in the influenza virus. Thus when two related phages, differing from one another in at least two characters, infect the same bacterium, a new phenomenon is observed. This consists of the appearance of phage types that were not present in the input and that represent new combinations of the characters of the parents. Thus, infection with T4 r and T2 gives rise to four types: T2, T2 r , T4, T4 r ; infection with T2 h and T2 r gives T2 h , T2 r , T2 hr , and T2. Furthermore, independently isolated r mutants of the same phage are seldom, if ever, identical, and are actually not allelic, since upon mixed infection with two r mutants one obtains some r^+ recombinants. Thus it is pointed out that a mixed infection of a single bacterium is equivalent to an experiment in population genetics rather than to a cross between two individuals. The yield of each individual phage is not equal to that which it would be if only one were present; in fact the several phages share the total yield. If two

separate infections with related phages are made at an interval of time, while the bacteria are actively metabolizing, a mechanism for the exclusion of the second phage comes into operation; and if the two phages are unrelated, mutual exclusion occurs, usually accompanied by a yield-depressing effect. In plant viruses, cross-infection effects usually imply relationship, but exceptions are pointed out.

As regards virus variation it is stated that "just as in higher organisms, most (but not all) variation in viruses appears to occur through an essentially random production of mutations. The range of mutability is determined by the intrinsic potentialities of the genetic material of the virus proper." The frequency of mutations in bacteriophages is often of the order of 1 in 1000 particles, and a phage may acquire by one mutation the ability to grow on a different species, or even genus or family, from its original host, so that host range is useless as a criterion for taxonomic identification. Mutants of plant and animal viruses, however, show considerably greater stability. Evidence is also considered which shows that mutants for resistance are present in bacteria before they come into contact with phage and that each mutation producing phage resistance behaves as a change in a single gene, as in resistances to virus found in plants and animals.

Interesting evidence is presented for the multiplication of some viruses in their insect vectors, though none is forthcoming to suggest an alternation of plant and insect or animal and insect parasitism. The ability of a virus to multiply in two hosts, one feeding on the other, is simply considered as an adaptation by natural selection, to a mode of life more favourable for survival.

The final question of the origin of viruses is prefaced by a review of the evidence for their role in the production, at least of a number, of tumorous growths previously classed as spontaneous; the whole question is rich in speculation, with relatively little factual evidence, but the author maintains that virus variability, either of the genetic type or of the host-controlled type observed with bacteriophage, can well provide the necessary variety of tumour types from a relatively small number of latent viruses. Little sympathy is accorded to the theory of the origin of viruses by regressive evolution and the fact that the genetic materials of host and virus can also merge, as is shown by the transduction of characters from one bacterium to another by infecting phage particles, is thought to be more significant in explaining both the nature and

origin of viruses. It is doubtful, however, whether the comparisons drawn between virus behaviour and cytoplasmic inheritance of various factors in *Paramecium*, *Drosophila* and yeasts contribute much to the elucidation of the problems either of the origin or nature of viruses, beyond once more stressing the basic features of the merging of genetic material and integration at the cellular level which are said to be the common denominator of all theories; and the argument ends with a question, namely whether this merging is "a novel and exceptional feature, leading mainly to the formation of abnormal complexes of low evolutionary value (diseased organisms) or if it is an example of a process that has played and is still playing an important role in evolution and possibly in development." There is an appendix dealing specially with the rickettsiae. The book is well and accurately printed and terminates with a bibliography of over 700 references.

WHITEHEAD, T., MCINTOSH, T. P. & FINDLAY, W. M.

The potato in health and disease.

Oliver & Boyd, Edinburgh and London 1953 : 3rd ed. : 60s. : Pp. 744 : 87 figs. : 36 tables.

The first edition of Dr. T. P. McIntosh's book on the potato, published in 1927, contained 264 pages. Later Dr. McIntosh was joined by Dr. T. Whitehead and Mr. W. M. Findlay, and together they published in 1945 their well-known book *The Potato in Health and Disease*, which had by then grown to 400 pages (cf. *PBA*, Vol. XVI, p. 252). The same trio of authors have now presented us with a partly rewritten and greatly enlarged new edition extending to 744 pages. The price has also gone up to 60s. New chapters have been added on Breeding, Animal pests, Machinery, and the Relation of viruses to the plants they infect. In making these additions, and in bringing the other sections up to date, the book has been transformed from a readable work into an encyclopedia. Its mere size has become such that this reviewer for one failed to find a comfortable position in which to hold it. In fact, it is no longer a book that one would sit down and read; it is a volume which will find its home on a library shelf, where it will serve as an invaluable work of reference—except for the defect that the reader will have to refer to several places to gain most of the information he is seeking. Thus, for instance, literature references occur as footnotes to some of the pages, as lists of references at the ends of some of the chapters and as a bibliography covering some 50 pages at the end

of the main body of the text but before the appendixes. Breeding for disease resistance is treated in the chapter on breeding and also in some of the separate sections of the chapters on diseases.

Possibly in response to criticisms of the omission of eelworm from the second edition, the third devotes 36 pages to a painstaking exposition, on encyclopedic lines though not without occasional errors, of eelworm problems. The section on virus disease also amounts to a treatise on the subject and one cannot avoid asking oneself whether it would not have been better to have published it as a separate book, or alternatively to have reduced it drastically and referred readers to Bawden's book on *Plant Viruses*. If information on the potato continues to grow at the present rate it would seem essential for the authors to consider some form of splitting up the work or curtailment of its scope if they contemplate a further edition in another five or so years' time. The section on varieties, for example, might well be enlarged by a competent expert and made to stand on its own feet. With these reservations, concerning more the form than the contents of the book, it can be recommended, as was the previous edition, as the most comprehensive and up-to-date reference work on this important subject.

HOGEN-ESCH, J. A. & ZINGSTRA, H.

Geniteurslijst voor aardappelrassen 1954. (List of the genetic origin of potato varieties, 1954).

Commissie ter Bevordering van het Kweken en het Onderzoek van Nieuwe Aardappelrassen. Wageningen 1954 : f. 1.75 : Pp. 128.

This new reference book for potato breeders, issued by the Committee for the Breeding and Testing of New Potato Varieties in the Netherlands, contains a list of some 330 varieties, arranged in alphabetical order, together with comprehensive data on the parentage, breeder, country of origin, commercial importance, yielding capacity, quality and disease resistance of each variety. A compact series of tables is also provided to sum up this information in the case of the 200 most important commercial varieties. The practical value of a publication of this kind needs no stressing. Although the agronomic data provided are based upon results of trials and tests conducted under Netherlands conditions, the information given in this carefully and attractively produced booklet should assist potato breeders everywhere. Information of general interest on the technique and objects of potato breeding, especially for resistance to

Phytophthora, is included in short introductory and concluding articles and a list of breeders in the Netherlands and a survey of the literature are provided.

Seed samples of the varieties listed may be obtained upon application to the Commission.

SORNAY, P. DE

Manuel de la canne à sucre à l'usage des chargés de cours et des élèves des grandes écoles coloniales. (**Sugar cane manual for the use of lecturers and students at colonial colleges**).

The General Printing & Stationery Co., Ltd., Mauritius 1952 : 2nd ed. : Pp. 279 : figs. : tables : plates.

Although a number of works on the subject of the sugar cane industry have appeared of late, this book is a welcome addition to the list, providing as it does a simple, concise account of the botany and cultivation of the plant that should prove of considerable value to the student of tropical agriculture. The author, formerly director of the Agricultural Station at Mauritius, naturally bases the subject matter of his book on his own personal experiences in the island, but also includes much valuable information on cultural methods employed in a number of other cane-growing countries.

The opening chapter deals with the history of the crop, its origins and introduction into the New World. Chapters II, IV and VII provide a general description of the botany of the plant, whilst Chapter III describes the salient features of the main species of *Saccharum*. Chapters V and VI list the principal varieties cultivated in the different sugar-producing countries of the world and give the genealogy of the present POJ lines. Technique and aims in breeding, vegetative propagation and the lay-out of variety trials are all discussed in an absorbing and lucid manner. Chapter VIII analyses the chemical composition of the cane, and the influence upon sugar content of variety, age, climate, soil and agronomic technique, whilst Chapters IX and X deal with the effect of soil and climate, respectively, on the cultivation of the sugar cane in Mauritius. Chapters XI to XVII discuss practical aspects of cultivation, including harvesting, crop rotation, the use of leguminous crops as green manure, fertilizers and irrigation. In Chapters XVIII and XIX, respectively, the more important insect pests and diseases of the cane are considered. An appendix provides interesting data on the history of sugar-cane cultivation and the annual production of the chief cane-growing countries. The only criticism that can be made of this

work is that the subject matter is not always treated in a logical sequence. For example, one would have preferred Chapters VII and VIII, on the botany and chemical composition of the different parts of the cane, respectively, to have followed Chapter II, which provides a general botanical description of the plant. This, however, is a minor point, amply compensated by the general easiness of style, some interesting photographs and a number of informative diagrams.

HOUTZAGERS, G.

Houtteelt der gematigde luchtstreek. Deel I. De houtsoorten. (**Sylviculture in the temperate zone. Part I. The forest tree species**).

Tjeenk Willink, Zwolle, Netherlands 1954 : f. 42-50 : Pp. xii + 576 : figs. : tables : maps : plates.

The author, a professor at the Agricultural University of Wageningen, states in his preface that there are doubtless many gaps in his treatment of the principal European species of forest trees. In this, however, he probably does himself an injustice, for the book not only presents a comprehensive and thorough survey of the main species and subspecies of the coniferous and broad-leaved trees of the European, American and Asian continents, but also includes informative data on the geographical distribution of each type, its economic importance, soil requirements, the diseases and pests to which it is subject and silvicultural methods recommended. Each species is given its botanical designation, together with the corresponding Dutch, English, French and German common names, and botanical and morphological characters are amply described and clearly illustrated. The whole is clearly set out and speedy reference is facilitated by the detailed alphabetical index at the end of the book. In view of the amount of data compressed into such a comparatively short space, the work is written in an interesting, if somewhat matter of fact, style and should prove of value both as a manual of instruction for students and as a general book of reference for libraries. The numerous illustrations and attractive photographs, some of them in colour, do much to enhance the appeal of this well produced publication.

HAWTHORN, L. R. & POLLARD, L. H.

Vegetable and flower seed production.

The Blakiston Company, Inc., New York-Toronto 1953 : Pp. xiii + 626 : 70 figs. : 17 tables.

This publication is intended to serve both as a

textbook for college students and as a guide to all those connected in various capacities with the industry of producing seed of vegetables and flowers in the United States. It should also prove useful to those interested or engaged in seed production of these plants in other countries. Part I is concerned with general topics, containing four chapters dealing broadly with business aspects of seed growing, the history of the industry in the United States, environmental factors in relation to seed production both in the United States and other countries, and breeding. The chapter on vegetable and flower breeding provides a competent introduction to the subject for those with little previous knowledge. The remainder of the book is devoted to the methods employed in producing seed of the individual crops and flowers. Part II, dealing with the vegetables, is conveniently arranged according to botanical families. Information on breeding is included; the sections on this work are usually as adequate as was perhaps feasible in a book of this kind but a few give the impression of insufficiency, as for example, in the case of asparagus. Part III covers the production of flower seeds and is arranged alphabetically according to common names. Such an arrangement has its disadvantage, particularly for readers outside the United States, and the omission of most Latin names from the index does not mitigate this disadvantage. Breeding work on various flowers is briefly described. Part IV completes the survey with chapters on harvesting and milling equipment, seed storage, and handling and marketing. The authors have on the whole succeeded in giving a clear and readable account of the diverse activities of the industry.

HUELSSEN, W. A.

Sweet corn. Economic crops. Volume IV.

Interscience Publishers, New York & London 1954 : \$10.50 : Pp. xv + 409 : 30 figs. : 49 tables.

In his preface, the author, who is Professor of

Vegetable Crops at the College of Agriculture, Illinois University, writes that he "has made a serious effort to review the literature on sweet corn and it is doubtful whether anything of significance has escaped his attention." This assertion is certainly justified by the authoritative nature of his survey in which the many different aspects of sweet corn as a crop are each comprehensively considered; all the chapters reach an excellent standard and the economical style of the writing is commendable. The applicability of the results of the much more extensive research on field maize to sweet corn improvement and production is as far as possible assessed, and in compiling the review the need for close cooperation between breeders and processors has been kept well in the foreground. Chapter I deals with the origin of sweet corn, Chapter II with taxonomy and morphology. Chapter III collates information on the origin of open-pollinated varieties and their uses. The next chapter is concerned with breeding sweet corn hybrids, surveying not only the main theories of heterosis and the problems involved in the production of inbreds and hybrids, but also investigations on the inheritance of many individual characters of economic importance. Chapter V deals with various factors affecting germination and growth of the seed, and is complemented in Chapter VI by an analysis of the physiological aspects of germination, growth and maturity. Mineral nutrition and the plant in relation to its environment are the topics of Chapters VII and VIII respectively. Industrial aspects are reviewed in the next four chapters: the history of the corn canning industry; growers' contracts and handling the raw product; factors affecting canning operations; and freezing, salting and dehydrating. Chapter XIII surveys information on the nutritional value of sweet corn when fresh and processed; the concluding chapter provides a statistical summary covering the economics of the crop. Appended to each chapter is a conveniently separate bibliography. This survey can be recommended without reservation.

NEW JOURNALS

Araneta Journal of Agriculture

This quarterly journal is the official organ of the Araneta Institute of Agriculture in the Philippines. The first number includes articles on kenaf propagation, crop competition, plant chemotherapy, an article on rice selection, summarized in Abst. 2044, and two papers on the animal side. The annual subscription is

P3.00 in the Philippines and \$2.00 (US currency) elsewhere. Communications should be addressed to the Editor-in-Chief, Araneta Journal of Agriculture, Victoneta Park, Malabon, Rizal, Philippines.

Información Técnica, Ministerio de Agricultura, Colombia

The first number of this new series, issued by the

Research Division of the Colombian Ministry of Agriculture, contains an article on physiological races of potato blight (*Phytophthora infestans*) in Colombia and Mexico (cf. Abst. 2173) and another on its control by N-trichloromethylthiotetrahydrophthalamide.

Communications should be addressed to División de Investigación, Ministerio de Agricultura, Bogotá, Colombia.

Za Socialističeskiju Seljskohozjaistvennuju Nauku (For Socialist Agricultural Science).

The Czechoslovak Academy of Agricultural Sciences is publishing this periodical in two series, A (agronomy and animal management) and B (economics). The papers are in Russian, but those in series B are sometimes provided with English, German or French summaries. The 1953 numbers of series A include articles dealing with plant breeding and introduction of economic plants into eastern European countries (cf. Absts. 1706 and 1762-3).

Inquiries relating to editorial matters should be

addressed to Praha XII, Slezska ul. 7 and those concerned with orders to Brázda, Praha II, Václavské nám. 47. The journal is offered in exchange for other agricultural or forestry periodicals. The annual subscription is 310 Kcs.

Zemledelie (Agriculture)

Zemledelie (Agriculture), published monthly by the Ministry of Agriculture of the USSR, covers the field of agricultural subjects previously dealt with in *Selekcija i Semenovodstvo (Breeding and Seed Growing)* and *Sovetskaja Agronomija (Soviet Agronomy)*, which have recently ceased publication. The first number contains papers on wheat breeding, selection of seedling potatoes, determination of oil content in sunflower and breeding in a wide range of economic plants in Rumania (cf. Absts. 1718, 1860, 1879, 2139, 2349).

The subscription is 3.50 roubles per number. Further information may be obtained from the following address: Moscow, 12, Proezd Vladimirova, Dom 6, Pod'ezd 1, Komnata 314.